INEERING
RARY

MAY 2 1

ENGINEERING NEWS-RECORD

MAY 17, 1945

Aerial pipeline crossing of Brazos River carries Texas gas to Pittsburgh furnaces.

The "Floating Piers" of this Transfer Bridge are *protected* with BYERS WROUGHT IRON

These new pontoons, which support the outer end of a Western Maryland Railroad transfer bridge in Baltimore Harbor, represent an interesting departure from past practice.

The Engineering Department of the railroad settled on Byers Wrought Iron for constructing the pontoons, which were fabricated from 3/8-in. and 5/16-in. plates by the American Electric Welding Company of Baltimore. The interior framework, which was not exposed to severe corrosion, was made of ordinary structural materials.

This application is, of course, merely an extension of one of the older and most firmly established wrought iron services, for the material has been utilized for pier protection plates, where the service is identical, for many years. As a matter of fact, one of the classic examples of wrought iron's unusual service comes from the Baltimore district. The piers of the bridge over the Susquehanna, only a mile from Chesapeake Bay, were plated with wrought iron soon after the turn of the century. Engineers who inspected the installation after it had been exposed to severe corrosion from brackish water for at least 35 years, reported it as still in good condition.

The war of course halted the extensive construction of large bridges, but in the "thirties" such outstanding structures as the Marine Park Pier, South Boston, Mass.; the Troy-Menands and the Troy-Rensselaer Bridges, New York; the Hampton Boulevard Bridge, Norfolk, Va.; and the 4.35 mile Mississippi River Bridge at New Orleans, all utilized wrought iron to protect piers . . . and these represent only a few of many.

The unusual corrosion resistance that recommends wrought iron for this service comes from its unique structure. The main body of high-purity iron has tiny fibers of glass-like silicate slag threaded through it. These fibers act as baffles, to halt and deflect corrosive attack, and so discourage pitting and local penetration. The fibers also help anchor the initial protective film, which shields the underlying metal.

Our bulletin, "Wrought Iron in Bridge Construction," gives details on this and other wrought iron bridge applications. We will be very glad to send you a copy, on request.

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WALDO G. BOWMAN, *Editor* ALBERT E. PAXTON, *Publisher*

Vol. 134 MAY 17, 1945 No. 20

COMING NEXT

• Now that the European war has been successfully concluded, the story of the rebuilding of the port of Cherbourg can be told. Although wrecked beyond anything anticipated, nevertheless, it was rebuilt to handle 25 times its normal peacetime capacity. The engineering achievement ranks among the greatest of the entire war effort. Waldo Bowman, editor of *ENR*, will describe the construction operations in the May 31 issue.

• A 200-acre working model of the Mississippi River drainage area is being built to facilitate studies of the complex problems relating to the coordinated operation of flood control reservoirs in the river basin. The model represents about 1,244,000 sq. mi., and is being built by prisoner-of-war labor at an estimated cost of $3,000,000. The project will be described in *ENR* for May 31.

• High velocity and the tremendous energy developed by 200,000 sec. ft. of water falling 487 ft. over the spillway of Shasta Dam required that excess water and entrapped air be removed from the concrete to increase its hardness and resistance to wear. About 0.85 lb. of water per sq. ft. of surface was removed by vacuum process at a cost of 20 cents. How this operation was carried out will be discussed in the May 31 issue.

LOOKING AHEAD

• Following his general comparison of United States and Brazilian building codes (*ENR* April 19, 1945, vol. p. 565), Arthur J. Boase will analyze specific differences and their effect in an article scheduled for early publication. As an example, Mr. Boase re-designs a 16-story apartment building recently erected in Rio de Janeiro using the A.C.I. Building Regulations.

• A four-lane retractable concrete pontoon bridge with 170-ft. clear span, in open position, has been completed in the Los Angeles Harbor. Special interest is attached to original ideas in the use of shear lugs, guide yokes and ramp knuckles. The design and construction features will be described in an early issue.

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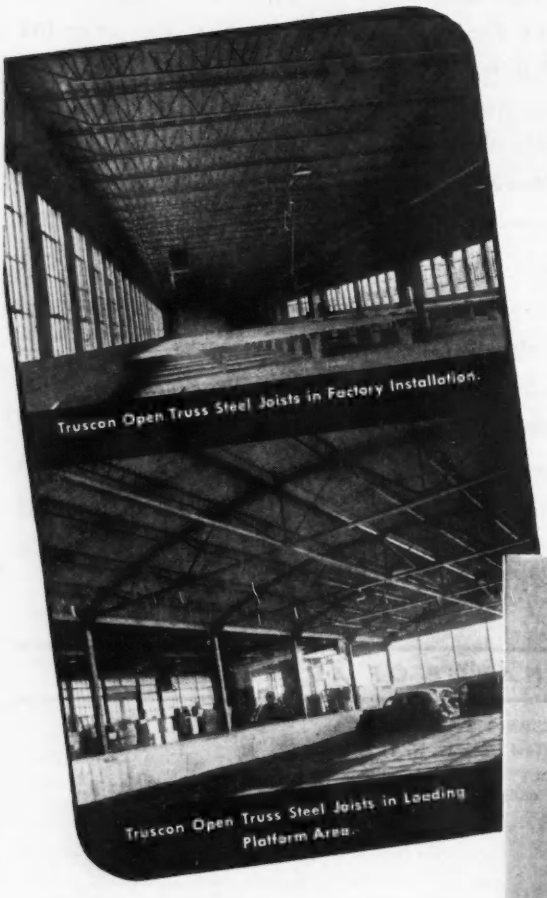

Truscon Open Truss Steel Joists in Factory Installation.

Truscon Open Truss Steel Joists in Loading Platform Area.

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Span the Continent

*Reg. U. S. Pat. Off.

Postwar Planning Progress Report

IDENTIFIED AND RECORDED engineering projects proposed for construction in the postwar years total $20,418,890,000 for the 28 months from January 1943 through April 1945 as reported to *Engineering News-Record*. Of this proposed volume, $8,497,406,000, or 41.6 percent of the overall total, has plans under way or completed.

Postwar projects ready for bids with all planning completed and all land, legal and financing obstacles overcome are valued at $675,964,000. Projects with financing available but planning unfinished are valued at $488,582,000. Combined, these projects with financial arrangements completed total $1,164,546,000, 13.7 percent of the planning stage total. In addition, project worth $379,619,000 have plans completed, but are held up by lack of financing.

Geographically, distribution of the postwar volume continues spotty. However, one newcomer, Illinois has been added to the roster of states—Pennsylvania, Florida and Ohio—that are above the U. S. per capita average for postwar projects with plans under way or completed. Prior to April, Illinois planning stage per capita volue was $46.40, but with the addition of $211,766,000 in planned projects during April, the per capita figure climbed to $73.10.

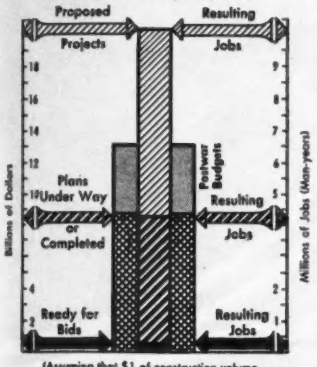
Eleven states, the same as reported in March and shown on the chart below, record higher proposed and planning stage per capita averages than those reported for the country as a whole. Eleven other states, all West of the Mississippi except Vermont, and all heavily weighted with federal projects for flood control, irrigation or hydro-electric construction, top the proposed per capita volume for U. S., but are below the national average for projects in the planning stage.

(*Postwar Project Reports page* 148)

POSTWAR ENGINEERING CONSTRUCTION VOLUME PROPOSED, PLANS UNDERWAY OR COMPLETED, AND READY FOR BIDS

Status of postwar planning reported to ENR compared with annual postwar construction budget based on assumed National Income of $150,000,000,000 per year.

(Jan. 1, 1943 to Apr. 26, 1945)

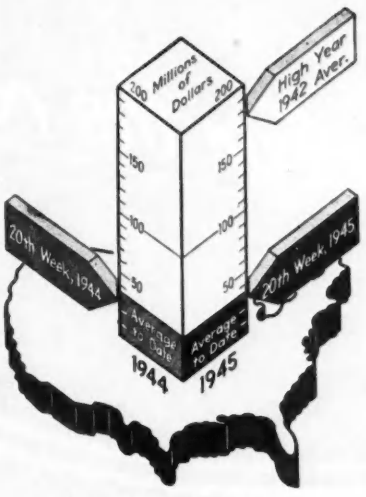


(Assuming that $1 of construction volume produces 1 man-hour of labor, ½ on site)

HIGHEST RANKING STATES IN POSTWAR CONSTRUCTION PLANNING

As Reported to *Engineering News Record* from Jan. 1943 through Apr. 1945

CONSTRUCTION ACTIVITY



As Reported This Week to *Engineering News-Record*

CONTRACT VOLUME

Continental U. S. Only
(Thousands of Dollars)

	Week of May 17 1945	Cumulative 1945 (20 wk.)	Cumulative 1944 (20 wk.)
Federal	$20,138	$364,222	$471,616
State & Municipal	5,389	86,488	71,471
Total Public	$25,527	$450,710	$543,087
Total Private	3,522	178,411	163,047
U. S. Total	**$29,049**	**$629,121**	**$706,134**

WHERE CONSTRUCTION ACTIVITY ORIGINATED THIS WEEK

Type of Work	Dollar Volume (Thousands) This Week	Cumulative 1945 (20 wk.)	Cumulative 1944 (20 wk.)
Waterworks	$2,023	$15,342	$9,160
Sewerage	686	11,700	8,710
Bridges	125	10,494	4,387
Highways	3,824	59,814	62,497
Earthwork, Waterways	281	13,709	21,849
Buildings, Public	8,970	256,396	278,109
Industrial	2,138	125,634	68,883
Commercial	1,160	31,092	77,877
Unclassified	9,842	104,940	174,662

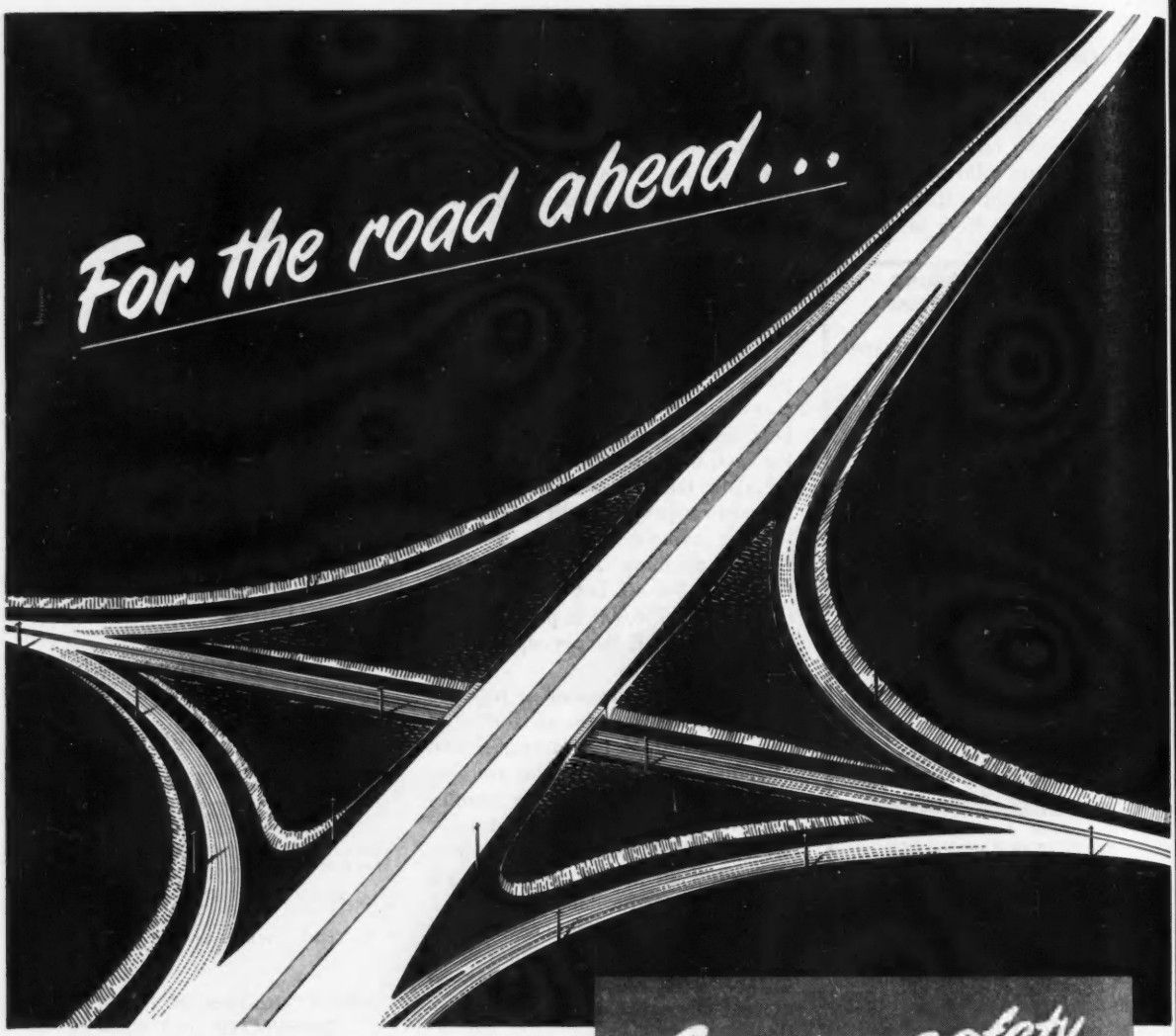
NOTE: Minimum size projects included are: Waterworks and waterways projects, $15,000; other public works, $25,000; industrial buildings, $40,000; other buildings, $150,000.

NEW PRODUCTIVE CAPITAL

	Cumulative 1945 (20 wk.)	Cumulative 1944 (20 wk.)
NON-FEDERAL	$241,678	$170,641
Corporate Securities	69,993	72,499
State and Municipal	150,785	44,362
RFC Loans	20,900	53,780
FEDERAL	$251,010	$245,266
Total Capital	**$492,688**	**$415,907**

ENR INDEX NUMBERS

Index Base = 100		1913	1926
Construction Cost	May '45	307.43	147.78
Building Cost	May '45	238.46	128.90
Volume	Apr. '45	99	43



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The Week In Engineering and Construction

ENGINEERING NEWS-RECORD • MAY 17, 1945 • VOLUME 134 • NUMBER 20

Construction industry's role in postwar era is uncertain

Poor planning progress, need for partial stabilization and necessity for federal action creates confusion as to part industry is to play, Senate hearings reveal

If the construction industry is to play its proper role in the postwar period, many major questions concerning the industry must be answered first, according to testimony presented last week before the Special Senate Committee on Small Business.

The outlook for the industry in the immediate postwar period is "far from bright" because of the poor planning progress to date, Maj. Gen. Philip B. Fleming, Administrator of the Federal Works Agency, reported. Regarding progress by local public works agencies, he said, "I doubt if the counties and cities would be able to put $600,000,000 worth of construction into operation during the first postwar year on the basis of their present plans."

General Fleming considers lack of funds for planning as the primary reason for the poor progress by local groups. Referring to a recent survey he said, "Many of the local governments reported they lacked funds to bring the plans in the design, preliminary and idea stages up to completion because of local laws restraining the use of accumulating reserve funds and for other reasons. The survey also showed that while they had completed plans for nearly $1,000,000,000 worth of public works, they had in hand less than a third of $1,000,000,000 to finance the construction. Most of the cities said they were looking to the federal government for assistance."

As a result of this poor progress, General Fleming considered woefully small the $17,500,000 recently made available to local agencies (*ENR* May 10, 1945, vol. p. 675).

Wallace outlines a program

A 4-fold program which he considers should be the objective of both the construction industry and the Federal government during the transition period was outlined by Secretary of Commerce Wallace. His program called for: (1) rapid expansion of construction activity as soon as resources can be released; (2) maintenance of a continuing volume of construction at from 15 to 20 billion dollars a year with a view to maintaining full employment in the industry and in the economy; (3) more construction for more persons and industries at less cost which he summarized in the motto "More goods for more people at less cost"; and (4) stabilization of construction activity in a manner to give the industry maximum effectiveness in preventing business depressions without preventing normal growth.

In discussing the question of full employment in the industry, Secretary Wallace said, "There is also the question of whether a volume of 15 to 20 billion dollars, continuing year after year, can be handled on a sustained yield basis without the over-building which inevitably leads to collapse. We shall want to give very careful consideration to this problem over the next several years."

Responsibilities of the Department of Commerce for achieving the four broad objectives in connection with construction, according to Secretary Wallace, are as follows: (1) development of

(*Continued on next page*)

Signal Corps photo

Three generals at Rhine bridge dedication

Three happy generals — affectionately known to their friends as Georgie, Dinty and Eddie—smile as they contemplate the completion of a railroad bridge across the Rhine at Mainz, Germany, in 9 days and 22 hours. They are Lt. Gen. George S. Patton, commander of the U. S. Third Army, Maj. Gen. Cecil R. Moore, chief engineer, Communications Zone, European Theater of Operations, and Brig. Gen. E. G. Plank, commanding general, Advance Section, Communications Zone. It was one of General Plank's Construction Group's, under the command of Col. Harry Hulen, incidentally a West Point classmate of General Patton, which built this Franklin D. Roosevelt Memorial Bridge, breaking all records for Rhine river crossings, including that of one Julius Caesar, who recorded that he had done it in ten days 2,000 years ago.

better factual information and the interpretation of this information for the use of the industry and as a guide to public policy; (2) purposeful analysis of the industry with relation to the objectives and in terms of industry requirements and business and government policies; (3) cooperation with the industry to make this information and analysis most useful to it and to stimulate and encourage its activities aimed at these objectives; and (4) promotion of technological developments leading to better structures and lower costs.

Beardsley Ruml, chairman of the business committee of the National Planning Association, testified that past experience has shown that public works cannot be used successfully as the only or principal means of combating employment, because of the high level of expenditures required for this purpose. He said, "We must never forget that the bulk of construction over a period of time should arise from private demand and that the greater the proportion of private demand, the healthier the industry will be. Optional public works should be looked to only as a balancing factor, not as the main source of demand for construction."

A yearly construction volume of $15,000,000,000 to $20,000,000,000 would not be excessive considering the present price level and the experience of the '20's in connection with the industry, Mr. Ruml believes.

Pirnie asks for immediate action

Malcolm Pirnie, past-president of the American Society of Civil Engineers, took a view similar to Mr. Ruml's regarding the part public works construction should play. He declared, "As engineers who live with the construction programs from day to day and year to year, we know from experience that a high level of private construction creates most of the need for public construction, and that overemphasis of public works after this war will add greatly to the national debt."

If the construction industry is to overcome the obstacles now delaying preparation of sufficient plans, Mr. Pirnie believes the federal government must take six major steps. These are: (1) allow the cost of private construction plans to be considered as current operating charges, exempt from federal income taxation; (2) beginning immediately, gradually lift the limits to construction work established by the War Production Board's L-41 order; (3) if possible, permit an immediate general tax reduction—if this is not possible then provide an incentive for risk capital to enter the construction field by exemption from surtax of income invested in construction; (4) through the WPB, make tools and materials available for the manufacture of construction equipment for contractors (5) increase the 17½ million dollars public works planning loan fund administered by the Federal Works Agency; and (6) establish a statistical survey of construction plan preparation and actual construction volume, on a full-time basis.

Robinson Newcomb, director of construction research, War Production Board, declared that the construction industry must be stabilized to a considerable degree if stable national economy is to be obtained in the post-war period. He declared, "This industry, which accounts for roughly 11 percent of the total economy, is an industry which has fluctuated over a range of 600 percent in the ten years of 1933-42 and 400 percent in the five years of 1929-33. An industry which is popularly known as the second largest employer of labor but which fluctuates in such an extreme fashion is a threat to the economy, to the price level and to the pay envelope of all workers. If we are to have relatively full employment for any extended period these wild gyrations must be held in check."

Mr. Newcomb also said, "For construction to get back only to its average relationship (to the national income) it must be increased to about five times its present percentage of national income. This may be an extremely difficult problem."

The hearings before the Senate committee will continue for some time.

• • •

Smith and Marshall made rear admirals

W. H. Smith and Edward L. Marshall have been advanced to rear admirals in the Civil Engineer Corps of the Navy. Seven other CEC officers were promoted to commodores: W. O. Hiltabidle, P. J. Halloran, B. W. Fink, Jr., W. B. Short, R. C. Johnson, C. C. Seabury, and R. H. Meade.

Admiral Smith

Rear Admiral William H. Smith is from Boston and a graduate of M.I.T. in 1915. He was commissioned in the Civil Engineer Corps of the Navy in 1917 and has served continuously for 26 years. During the first World War he was assistant public works officer of the Norfolk Navy Yard, then served at Panama and San Diego. Transferring to the Bureau of Yards and Docks, he became special assistant to the design manager in connection with a major floating drydock program.

In 1935 Smith was a delegate to the international navigation congress at Brussels and reported on port facilities and drydock developments in all of Europe. For five years he was public works officer of the New York Navy Yard, where he planned and directed the $100,000,000 war expansion of the yard. In 1943 he became director of the Planning and Design Department of the Bureau of Yards and Docks.

Rear Admiral Edward L. Marshall is a graduate of the engineering school of Tufts College in 1914. He was employed in the bridge and building department of the Boston and Maine Railroad until 1917, when he entered the Civil Engineering Corps.

Admiral Marshall

Marshall's service since 1917 has been largely as public works officer at several yards particularly naval air stations. In the "lighter-than-air" period of naval aircraft development he was at the Lakehurst, N. J. station, the Naval Aircraft Factory at Philadelphia and the Naval Air Station at Anacostia, D. C. From 1931 to 1934 he was public works officer at the Sunnydale, Calif. air station, then for two years was at Cavite, P. I.

In 1937 Marshall became head of the aviation division of the Bureau of Yards and Docks. On reorganization of the bureau in 1941 he was made director of the Financial and Operating Department and since last November has served as chief inspector of the bureau.

• • •

Application is made for a 1,216-mi. gas pipeline

An application for permission to build a 1,216-mile natural gas pipeline from the Hugoton fields of Texas and Oklahoma to Milwaukee and other cities in Wisconsin, Iowa and Michigan has been placed before the Federal Power Commission by the American Light & Traction Co.

Construction and operation plans accompanying the application for the $70,000,000 project call for a 26-inch welded steel pipe into Illinois and smaller pipes for distribution beyond. It is said that construction would begin by March 1, 1946, if a certificate of convenience and necessity is granted and if materials become available.

Groundwork laid by A.G.C. and A.F.L. for settling postwar disputes

Four-point program agreed upon is expected to make government intervention unnecessary in labor-management problems

A basic program that is expected to result in speedy and harmonious settlement in the postwar period of their mutual problems has been agreed upon by the Associated General Contractors of America and the Executive Council of the Building and Construction Trades Department of the American Federation of Labor. One of the aims of a labor relations study begun by the A.G.C. in 1937, the understanding reached last week is expected to avoid the need for government intervention in the case of disputes between members of the two organizations.

The program is to consist of four major parts. These are: (1) To maintain and improve the present working relations in the construction industry, which have been the best in the industry's history; (2) to prepare a record of the points of agreement existing on a national basis to provide a realistic guide for settling local disputes; (3) to set up a joint committee that would serve as a national board to handle within the industry the various problems arising which cannot be dealt with locally; and (4) to retain control over its own problems within the industry, rather than having to resort to federal or state intervention.

Harry A. Dick, of Portland, Ore., president of the A.G.C. considers the agreement as the first major step taken by management and labor with the aim of bringing about an orderly reconversion to peacetime construction work. Regarding the program decided upon he stated, "Management and labor in the construction industry believe that with their intimate knowledge of the industry they are better qualified than anyone else to work out the problems which will arise in the postwar period between labor and management in construction."

Formal relations between the A.G.C. and the Building and Construction Trades Department date from the fall of 1939 when the executive council of the latter met with the A.G.C.'s labor relations committee in Atlantic City. At that time a program was formulated for improvement in handling jurisdictional disputes to prevent stoppage of work. When war started, other negotiations then underway were interrupted.

On wartime construction the federal government took over most labor relations work. The A.F.L. construction unions made an agreement with the federal government and offered important concessions in overtime pay and working conditions, which stabilized to a great extent wages on government contracts. Now that the war has ended in Europe and Japan may be defeated in the next year, the A.G.C. and A.F.L. have resumed work on a program for effective cooperation in labor-management conditions.

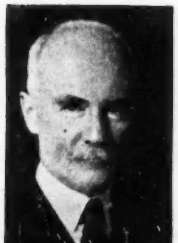
In working out details of the program agreed upon, committees from the two organizations will recommend points of agreement on a national scale which can be used by local groups of contractors and unions in conducting their negotiations. The national program is not intended to supplant local negotiations. Neither does it mean a closed shop for the A.F.L.

The A.G.C. is made up of about 3,200 general contractors doing building, highway and general construction. The Building and Construction Trades Department, A.F.L., is composed of the 19 international unions whose memberships are employed in construction.

. . .

Holton D. Robinson, bridge engineer, dies

Holton D. Robinson, senior member of the firm of Robinson and Steinman, one of the country's ablest and at the same time least known bridge engineers, died at New York on May 7 at the age of 82, as noted briefly in last week's issue.



Mr. Robinson's bridge design experience began in 1888, and his interest in suspension bridges, and especially in the design of cables for such structures, was first aroused by participating in repair of the Niagara Suspension Bridge in 1890. There followed a brief period with the Broadway Cable Ry., and four years with the New York Central bridge department.

In 1895 Mr. Robinson went to the new East River Bridge Commission, becoming assistant engineer in charge of cable construction on the Williamsburg Bridge in 1901. Later he became engineer in charge of the bridge work. In 1907 he went to the Glyndon Const. Co. as chief engineer to design their plant used in construction of the parallel wire cables of the Manhattan Bridge, continuing until 1910.

During the following decade Mr. Robinson was engaged chiefly in consulting bridge work, including service to the Canadian National Railways. In 1922–23 he was consulting engineer on cable design and construction for the Philadelphia-Camden Bridge, and after construction got under way (1923–26) Mr. Robinson became consulting engineer to the cable contractor, the American Cable Co. In this capacity he designed the erection installations, introduced flat-band seizing of the strands, designed the cable squeezing machines, and developed the method of wrapping the cable with wire that was used by the contractor.

In 1922 Mr. Robinson associated himself with David B. Steinman in consulting work, specializing in bridges. Notable suspension bridges designed by the firm include the Florianopolis Bridge in Brazil, Mount Hope Bridge in Rhode Island, Waldo-Hancock Bridge in Maine, Grand Mere Bridge in Quebec and the Thousand Islands Bridge over the St. Lawrence River.

During the construction of the George Washington Bridge at New York, the firm served as consultants to the cable contractors, the Bethlehem Steel Co.

Despite advancing years, Mr. Robinson remained active until his recent illness. One of his most recent engagements was as consultant to the Loss Committee for the Tacoma Narrows Bridge, in which capacity he crossed from shore to shore on each of the main cables to get first-hand knowledge of their condition.

. . .

Construction equipment output to continue high

The construction machinery industry will be called upon to maintain production in 1945 at or near present levels, the War Production Board's construction machinery division reports. It was explained that although military requirements for construction machinery would probably fluctuate now that there is victory in Europe, a "reasonably steady" demand for civilian use may be expected.

The value of construction machinery shipped in 1944 was approximately $820,000,000, an increase of $100,000,000 over the value of 1943 shipments.

MEN AND JOBS

Walter D. Binger, Commissioner of Borough Works in the Manhattan Borough President's office, New York City, since 1938, has resigned to become a vice president of the City Investing Co., where he will have entire charge of the company's postwar building program. Mr. Binger's place will be filled by Charles W. Williams, assistant borough works commissioner, and Theodore B. Richter, secretary to Mr. Binger, will succeed Mr. Williams.

Mr. Binger organized and headed the engineering group that designed and built the East River Drive. He later supervised construction of the East River Commercial Marginal Way. He subsequently directed development plans for a number of postwar projects including the Harlem River Drive and the Battery Park Underpass. Mr. Binger was a consulting engineer before he entered city service in 1934. He served first as deputy Sanitation Commissioner in charge of engineering, directing the design and construction of several incinerators and sewage treatment works, among them the $30,000,000 Wards Island plant.

Charles Tinant, previously at Vicksburg, Miss., an engineer on flood control work, was recently appointed city engineer of Rapid City, S. D.

A. T. Kranz, Hastings, Minn., has been reappointed acting county engineer of Dakota County, Minn. He was appointed to this position some time ago when H. E. Palmer, the county engineer, enlisted in the Navy.

Floyd Rubey, of Clarinda, Ia., has been appointed Marshall County engineer with headquarters at Marshalltown.

Fred W. Sarvis, of Marshalltown, Ia., has been appointed Monroe County engineer with headquarters at Albia.

Robert Edwards, Solon, has been named highway engineer for the Ohio State Department of Highways, Division 12, consisting of Cuyahoga, Lake and Geauga counties, succeeding Robert E. Willems, resigned. **Ralph Groves,** Granville, has been named executive secretary to Highway Director Perry T. Ford.

Gustave St. Jacques has been appointed executive assistant to the associate transit controller for Canada. He is a graduate in civil engineering of the Ecole Polytechnique. Since 1938 he has been the engineer supervising transport and waterworks services, Quebec Public Service Board.

Col. George W. Gillette, Wilmington, N. C., has assumed command of the Engineering Training Section at Fort Lewis, Wash., succeeding **Col. Leonard B. Gallagher,** who has taken command of all basic military training at Fort Lewis. Colonel Gillette formerly served as district engineer at Wilmington and went to his new post from Boston, Mass., where he was division engineer for the New England area.

Lieut. Horace Lee Johnson, Allison, Tenn., a civil engineer graduate of Duke University, 1944, now is serving with the Marine Corps in the South Pacific.

A. M. Brenneke, Denison, Tex., has gone to Caracas, Venezuela, to take a position with the National Institute of Sanitation. He will assist in the modernization, rehabilitation, enlargement and operation of many waterworks systems in Venezuela.

The firm name of R. F. Conlon Sons Construction Co., general contractors with offices at Dubuque, Ia., and St. Cloud, Minn., has been changed to Conlon Construction Co. The personnel remains unchanged with **O. M. and Orin J. Conlon** operating the Dubuque offices and **Vincent B. Conlon** the St. Cloud office.

H. E. Smith, Toronto, has been named district engineer for Canadian National Railways at Montreal. H. W. Fleming, who recently moved from Quebec to North Bay, succeeds Mr. Smith as district engineer at Toronto, and Mr. Fleming is succeeded at North Bay by W. H. B. Bevan of Montreal.

Capt. James H. Sawyer, Jr., New Bern, N. C., has been promoted to his present rank from first lieutenant. He is serving in France with the Army Engineers. Captain Sawyer was graduated from the North Carolina State College Engineering School in 1940 and took post-graduate work at Massachusetts Institute of Technology.

Squadron Leader R. A. McLellan, of Underwood & McLellan, engineers, Saskatoon, Sask., has been awarded the Order of the British Empire. He is in charge of water supply and sewage disposal systems for the Royal Canadian Air Force throughout Canada.

William A. Kerr, St. Petersburg, Fla., formerly Federal Security Agency area engineer for Florida and now superintendent of the water department of Camp Blanding, Fla., has been given a cash award under the War Department's "ideas for victory" program for perfecting a device that saves from $1,000 to $1,500 a year in chlorinating the camp's drinking water.

Harvey Schmidt Amarillo, Tex., has been named county engineer at Canyon, Tex. He will plan a farm-to-market road system for Randall County and submit the plan to the Texas State Highway Commission as a postwar project.

Maj. Ben H. Petty, formerly assistant post engineer at Fort Knox, has replaced **Maj. James R. Campbell** as post engineer at Camp Campbell, Ky. Major Campbell has been transferred to Fort Knox. A reserve officer for a number of years, Major Petty entered active service in 1942, at Fort Benjamin Harrison, Ind., following his resignation as professor of highway engineering at Purdue University, Lafayette, Ind.

D. A. Richards, Youngstown, Ohio, has become city engineer at Struthers, Ohio, which has been without an engineer since Chester Haenny enlisted in the Seabees two years ago.

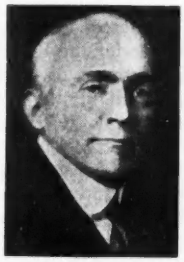
Group Capt. F. H. Marani has been named head of construction engineering in the Royal Canadian Air Force, with headquarters at Trenton, Ont.

Thomas F. McGovern, Jamaica Plain, Mass., has been promoted from assistant to chief engineer in the Boston Street department. He succeeds **William J. Sullivan,** retired on pension after 21 years as chief engineer in the street department and 54 years in the city service.

Myron V. Judd and **John S. Wood,** engineers on a railroad project for the Navy near Bremerton, Wash., have established an office in Bremerton for the practice of civil engineering and land surveying.

Nicholas H. Heck retires from Geodetic Survey

After 41 years of service, Nicholas H. Heck, internationally known engineer and scientist retired from the Coast and Geodetic Survey of the Department of Commerce on May 2. He had been scientific assistant to the director of the Survey.



After having received a civil engineering degree from Lehigh University in 1904, Mr. Heck immediately entered the service of the Coast and Geodetic Survey. He early distinguished himself by taking a prominent part in the development of the use of a wire drag to locate pinnacle rocks, which constitute a hazard for ships. This method has also been used to locate ships sunk by submarine.

During World War I, Mr. Heck served in the U. S. Navy in various secret scientific research projects. Through his efforts there was developed a method whereby a survey ship mapping the ocean depths could determine its position in fog for distances up to 200 miles offshore. This permitted survey ships to work day and night in the thickest weather.

He has served as a consultant for special scientific subjects during the present war. From 1921 to 1942 he was chief of a unit in the Coast and Geodetic Survey formerly known as the Division of Terrestial Magnetism and more recently the Division of Geomagnetism and Seismology. He is an international authority on seismology and has written numerous scientific articles for publication in the United States and in foreign countries.

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Emergency flood control funds voted by Senate

An emergency authorization of $12,000,000 of federal aid for local flood control work is provided in a bill (S. 938) passed by the Senate May 10. The money, if approved by the House and the President, will be spent under the direction of the Corps of Engineers.

Nevada starts survey of underground water July 1

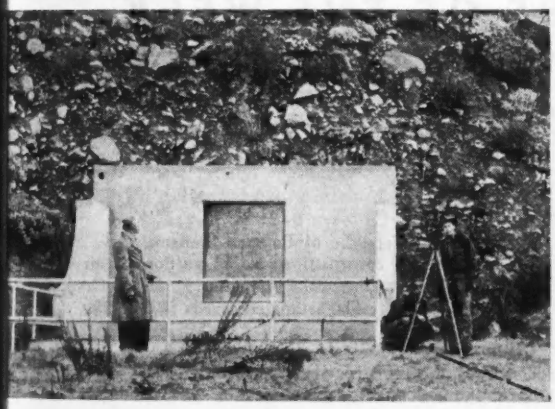
A two-year survey of Nevada's underground water supply beneath her vast, arid stretches to determine resources available for reclamation purposes will be launched July 1 as a joint state and federal undertaking.

Described by Assistant State Engineer Hugh Shamberger as one of the most far-reaching programs undertaken in this country, it will consist of reconnaisance surveys of valleys, inventory of all wells, establishment of a statewide well measurement program, installation of rain and snow surveys and establishment of new snow survey courses.

Cooperating with the state of Nevada, whose legislature early this year appropriated half of the $70,000 cost, will be the U.S. Geological Survey, U.S. Grazing Service and Bureau of Reclamation.

The tempo of the program will be speeded during the second year when it is planned to drill test wells and increase Geological Survey personnel available for investigations.

According to Mr. Shamberger, use of underground waters for irrigation purposes has increased considerably.



U. S. Bureau of Reclamation Photo

Preliminary work on San Diego Aqueduct is nearing completion

With indications of beating the original deadline on preliminary work for the $17,500,000 San Diego Aqueduct emergency project, survey work along the 71-mile route was nearly completed early this month, while preparation of plans and specifications was well under way.

Working under extreme handicaps, ten crews recruited from Bureau of Reclamation staffs throughout the southwest began surveying in mid-January under Engineer R. B. Ward. Work completed by the end of March included establishment of vertical control throughout the full length, location and profile surveys along 70 miles of the route, field drawings showing plan and profile for 54 miles, and designs and specifications for three of six tunnels and for 22 miles of pipeline.

Inlet end of the aqueduct will be the West Portal of the Colorado River Aqueduct's San Jacinto Tunnel (shown at left in above illustrations), and terminus will be San Vicente Reservoir, 18 miles east of San Diego, Calif., at right in the illustrations. From the outlet portal to a regulating reservoir three miles away, capacity will be 200 cfs., and from the regulating reservoir to San Vicente, capacity will be 85 cfs.

Flow will be entirely by gravity, with the hydraulic gradient for the aqueduct starting at El. 1,500, the point of diversion, and descending to El. 760, the ultimate high water line in San Vicente Reservoir. Terrain which will be crossed varies from relatively level alluvial terraces and rolling hills to rugged mountains.

Agreement to proceed with construction of the project despite critical manpower and steel situations was reached late in April through a compromise plan approved by War Mobilization Director Fred M. Vinson. Weeks of uncertainty concerning the urgency of the project ended with the decision to start preliminary construction immediately but to wait until Oct. 1 of this year to start fabricating steel and until Nov. 1 to begin tunnel work.

WASHINGTON HIGHLIGHTS

Public hearings on the proposed subway for the District of Columbia will be held June 6, the district commissioners announced early this month. Last fall a subway system 7.1 miles long and expected to cost over $56,000,000 was recommended by J. E. Greiner Co., Baltimore, Md., and De Leuw, Cather & Co., Chicago, consulting engineers (*ENR* Nov. 2, 1944, vol. p. 539). The hearings are planned to learn the pros and cons of the proposal. The method of financing the work has not been determined.

A bill (S. 938) to provide an emergency fund of $12,000,000 for flood-control work made necessary by the recent floods in the lower Mississippi River basin and other areas was introduced in Congress last week. The money, if provided, will be spent under the supervision of the Corps of U. S. Army Engineers. Not only could the fund be used for work made necessary by recent floods or those in the near future, but the bill permits the appropriation to be spent for completion of work begun under acts passed July 12, 1943, and May 29, 1944, and entitled "An act to provide for emergency flood-control work made necessary by recent floods and for other purposes."

The Senate recently passed a bill (S. 223) to provide federal aid for constructing a 1500-bed hospital center for the District of Columbia. The bill authorizes the Federal Works Administrator to acquire a site immediately upon the termination of the war and for the federal government to provide two-thirds of the cost, proposed to be made as an FWA grant, for erecting the buildings and installing the necessary machinery and equipment, and the other third would be borne by existing hospitals in the District of Columbia. These hospitals will participate in the establishment, operation and maintenance of the center. The total cost is estimated at over $20,000,000.

Lumber authorized for rehabilitation use overseas, including the construction of prefabricated housing for export, has reached the total of 280 million bd. ft. This amount includes 5 million for repairing dikes in Holland; 23 million for barracks to house workers repairing French ports; 5 million for repairing war damage in formerly occupied countries; 80 million for repair of bomb-damaged structures in England and 164 million for 30,000 "prefabs" for England.

A bill (H. R. 2871) to create a commission to be known as the Alaska International Highway Commission was introduced in Congress recently. The commission would consist of five members appointed for 2-yr. terms and to serve without salaries. The body would be authorized by the President to cooperate and communicate directly with any similar agency which may be appointed in the Dominion of Canada in a study for the survey, location, and construction of a highway to connect the Pacific Northwest part of continental United States with western Canada and the Territory of Alaska.

The War Production Board is now issuing for public distribution a monthly report on the production and availability of construction materials. A restricted report of this type has been prepared for several months but in April the WPB decided to make the information gathered each month available to the public. The data are gathered by WPB's construction bureau and its bureau of programs and statistics. Requests for copies of the report should be addressed to the Construction Research Branch, War Production Board, room 2729 Social Security Bldg., Washington 25, D.C.

Congress last week sent to the White House for the President's signature the Department of Agriculture Appropriation Bill for the fiscal year 1946. The bill (H.R. 2689) contains some funds for construction work. These are: $4,418,778 for construction and development of forest roads and trails; $1,500,000 for maintenance and reconstruction of forest highways; $1,063,000 for construction of experimental watersheds, stations and laboratories for soil conservation research; $1,165,066 for water conservation and utilization projects.

Recently introduced in Congress was a bill (H. R. 3150) to extend an act authorizing the city of Duluth, Minn., to construct a toll bridge across the St. Louis River between the states of Minnesota and Wisconsin. Also introduced was a bill (H. R. 3153) to extend the time for the construction of a St. Croix River bridge at Hudson, Wis.

JOBS OF THE WEEK

HOSPITAL, American Lake, Wash.

Veterans Administration, Washington, D. C., received the lowest bid for hospital additions and facilities from MacDonald Building Co., Tacoma, Wash., at $2,059,807.

AIRPORT, Panama City, Panama

Department of Public Works, Republic of Panama, Panama City, awarded a contract for design, engineering construction and inspection of airport, with 2-story, concrete terminal, and maintenance shops to F. H. McGraw & Co., Panama City and New York, N. Y. The estimated cost is $7,000,000.

COVERED STORAGE AREA, Terrance, Calif.

Bureau of Yards & Docks, Navy Department, Washington, D. C., awarded a contract for covered storage, to P. J. Walker Co., Los Angeles, Calif., at $1,609,513.

AMMUNITION MAGAZINES, Charleston, S. C.

V. P. Loftis, Charlotte, S. C., has been awarded a contract to construct additional ammunition magazines, with rail and highway facilities by Bureau of Yards & Docks, Navy Department, Washington, D. C., at $1,008,897.

AIRPORT ADDITIONS, Idlewild, N. Y.

Department of Marine and Aviation, City of New York, awarded a contract for grading, draining and paving to Gull & DeFelice, Brooklyn, at $2,345,000. The contract for electrical conduits was let to Plymouth Electric Co., New York, N. Y. at $508,000. Both jobs are for the municipal airport at Idlewild. Jay Downer, New York, is the consulting engineer.

BLUFF CREEK FILTER PLANT, Oklahoma City, Okla.

Harmon Construction Co., Oklahoma City, has been awarded the contract to build Bluff Creek Filter plant and pump station, with steel water tank, by City of Oklahoma at $1,032,214. V. V. Long & Co., Oklahoma City are the consulting engineers.

Note—Additional bidding and contract news on many projects large and small appear in the Construction News section beginning on page 173.

OBITUARY

John Reynard Todd, 77, former president of the Todd, Robertson, Todd Engineering Corp., which represented the Rockefeller interests in the construction and management of Rockefeller Center, New York City, died May 12. A graduate of Princeton University, Mr. Todd in 1920 organized and became president of the engineering corporation. This firm financed, built and managed the Graybar Building and was identified with the construction of other important New York buildings.

William J. Henderson, 45, associate professor of structural engineering of the School of Civil Engineer and Engineering Mechanics at Purdue University and authority on structural steel, died May 10. A native of New Jersey, he was graduated from Lafayette College in 1926 and was employed by the Bethlehem Steel Co. prior to joining the university civil engineering staff as assistant professor of structural engineering in 1929. He served as an engineer for the state highway department and several steel firms during the summer months.

Hayden C. Snoddy, 85, civil engineer with Stone & Webster at Houston, Tex., from 1910 until he retired 15 years ago, died at Houston on April 22.

J. E. Breen, former chief engineer of the Board of Public Service, Cincinnati, Ohio, died May 3. He had served in several engineering posts with the city from 1895 to 1906, before he joined the staff of the Long Island Railroad. He retired in 1932, after having served the Pennsylvania and Long Island Railroads for 46 years.

Clifton Rice, 68, Texas State Highway Department district engineer at Dallas from 1929 to 1936 and at El Paso from 1936 to 1943, died at Austin, May 2.

Klas Olaf Olson, 64, civil engineer and field property adviser for the Federal Public Housing Authority's Chicago regional office, died in Chicago, May 11.

Erwin Joseph Bradshaw, 47, civil engineer of Houston, Tex., died there April 28.

William Good, 44, civil engineer, died in Warren, Ohio, April 24. Formerly he was city engineer at Billings, Mont., and for the last three years was engineer at the Federal Machine & Welder Co. in Warren.

George Trowbridge Hand, 72, chief engineer of the Lehigh Valley R. R. for 20 years until his retirement in 1937 and since then a consulting engineer, died at Orange, N. J., May 13. Beginning his career in 1889 as a rodman for the National Docks R. R., a New Jersey road now part of the Lehigh Valley system, Mr. Hand later became principal assistant engineer in charge of construction, railroad, docks and warehouses. From 1900 to 1917 he served the Delaware, Lackawanna and Western R. R., as assistant engineer, terminal engineer, and finally as division engineer of the Morris and Essex divisions. In 1917 he became chief engineer of the Lehigh Valley. Since 1905, Mr. Hand acted as consulting engineer in many important improvements, including dock construction, tidewater and railroad terminals, coaling plants, coal shipping piers and grade crossing eliminations in various municipalities.

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Survey being made of Los Angeles wage scale

A settlement of wage disputes which have plagued the Los Angeles Department of Water and Power appears to be nearer as the city council has approved a contract between the department and a Chicago wage expert to examine thoroughly the wage structure of 5,300 department jobs.

The survey will be conducted by J. L. Jacobs and staff at a minimum cost of $20,000. A report on what each job is worth on the basis of what is being paid for comparable jobs in private industry elsewhere will be made to the Board of Water and Power Commissioners which will then attempt to set up a satisfactory wage scale.

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Texas counties claim war damage to roads

Nearly $100,000 damage has been done to highways in West Central Texas by army tire-testing vehicles, the State Highway Department revealed in a recent memorandum.

Claims for $95,700 damage to highways in Kerr, Kendall, Medina, Bandera, and Bexar counties will be filed against the federal government under the Defense Highway Act, it was announced. The test fleet still is operating on the roads. Pending filing of the claim against the government, the State Highway Department has appropriated money for repair of the roads.

Still going strong

The Board of Estimate of New York City has been asked by John H. Delaney, 74, Chairman of the Board of Transportation, to continue Jesse B. Snow, 77, chief engineer, due to retire June 1, as a consultant for one year at his present salary of $20,000.

Mr. Delaney said his board members want to keep Mr. Snow "so that the engineers might have the benefit of his advice and experience" on postwar projects. He has been chief engineer since 1934, and is recognized as an expert on the construction of underwater tunnels.

Work has been resumed on long Colorado tunnel

Full-speed-ahead orders on construction work for the Alva B. Adams Tunnel of the Colorado-Big Thompson Project, halted in January, were ordered recently by Harry W. Bashore, Bureau of Reclamation Commissioner, in order to meet a new project completion deadline of May 1, 1946, it was disclosed by E. B. Debler, Denver regional director of the bureau.

Plans for early completion of the 13-mile tunnel were made possible when the War Manpower Commission raised worker ceilings on the project and the War Food Administration declared the project essential to food production for the emergency. It is estimated the tunnel will carry 90,000 acre-ft. of irrigation water from the western slope of the Rocky Mountains to eastern Colorado during the growing season.

Features of the project to be completed include: Lining of all but four miles of floor and pouring of the arch lining of the tunnel; major portion of work on Shadow Mountain Dam and dike, and construction of a conduit to carry water from the east end of the tunnel to the Big Thompson River.

Shadow Mountain Dam will divert water of the Colorado River's north fork, whence it will flow into Grand Lake and then into the west entrance of the tunnel through a short conduit. After water reaches the Big Thompson it will be distributed in established irrigation ditches.

The Week In Engineering and Construction
Continued on page 116

Comment and Discussion

Readers' opinions on matters that concern engineers and contractors

U. S. Foreign Policy

Sir: I was much interested in J. H. McGraw Jr.'s statement "What Does America Want?" in *ENR* Jan. 11 (facing p. 144). Mr. McGraw says, in the 5th specification, that one of the desirable (necessary?) foundations for the future economic policies of the United States is "Willingness to assume a responsible national role in international arrangements to provide financial stability" for "exchange of goods and services." Of course, in this day and age this does not mean sending battleships and marines to enforce such obligations, but we need a realistic point of view in regard to economic sanctions.

Elihu Root, one of our really great statesmen, said nearly 40 years ago that our relations with the other countries of the Americas should be based on "mutual self-respect." That is a long way from our present policy of trying to buy good neighbors with charitable doles. We have done more to break down this mutual respect by our so-called "Good Neighbor Policy" than we can build up again in a long time.

We have done this not only by our unwillingness to assume national responsibility but by the positive encouragement on the part of our government of the repudiation by our neighbors to the South of their financial obligations. From this I should specifically except Argentina, which meets its financial obligations, and Venezuela which has no external debt.

For a few years after the war we shall probably see a boom in the sales of our manufactured goods and supplies to Latin American countries—goods bought with dollar credits they have accumulated here at the expense of our citizens who hold their defaulted bonds and who have to pay taxes to meet recent so-called loans. As soon as this spending spree is over, however, and Europe is again able to produce, our neighbors will turn back again to their erstwhile friends.

I agree with Mr. McGraw that we should have a clear understanding of American policy in foreign affairs. I doubt, however, if we will as long as we allow ourselves to be carried away by maudlin sentiment or by such shibboleths as the Atlantic Charter and the Good Neighbor Policy.

FRED LAVIS
Consulting Engineer
New York, N. Y.

River Valley Authorities

Sir: Proposals to create river valley authorities cause discussions in engineering as well as laymen's circles. Considerable controversy arises and it is interesting to analyze it in order to determine the possible outcome of the proposals.

As in the case of any new proposal the advocates of it are confronted with opposition. However, this opposition has not yet manifested itself in any consequential way. Any opposing action that may develop in the future will probably originate with the electric-power companies located in the valleys under consideration. It is thought that this opposition will be weak and ineffective.

There also may be opposition from officials of states included in a river basin who are opposed to further extension of federal control over their resources. This opposition may be more difficult to meet.

There are two trends of thought that accompany the proposals. One, sponsored by the Corps of Engineers, U. S. Army, does not favor the establishment of independent agencies such as Tennessee Valley Authority, but advocates the utilization of the facilities of existing agencies. By this proposal the Corps of Engineers would acquire the authority to administer the project with the assistance of several lesser agencies. The other trend, that of the administration itself, favors the establishment of independent agencies similar to TVA in various river valleys.

There is logic in the general idea of governmental development of river valleys and there are pro and con reasons for the two ways of accomplishing the task. It appears that the country has gone far enough along socialistic lines in national economy, to make it impossible for private enterprise to undertake a task of such enormous magnitude. Only the federal government is able to finance it, and to administer it in such a way that it is an asset to the people and not a burden.

As far as the debate on the way of administering the projects is concerned, it may be said that the theory of the U. S. Engineers' proposal is quite attractive. The utilization of all existing agencies and their facilities should, theoretically, be more economical than the creation of new agencies. However, this attractiveness may be overshadowed by two other factors. In order to make the existing facilities of many bureaus and agencies work in unison, a complete reorganization of the executive departments is necessary. At present, agencies such as Engineer Department of the Corps of Engineers, the Bureau of Reclamation, Geological Survey, Soil Conservation Service, Federal Works Agency and many others are performing specific functions delegated to them by Congress. Experience has shown that whenever cooperation between two or more agencies is desired, conflict of prerogatives of each agency make this cooperation difficult if not, sometimes, impossible.

Reorganization of the agencies is, of course, desirable but it appears that no immediate action is being contemplated. Another consideration against the Corps of Engineers taking a leading role in this undertaking is less tangible, but perhaps more important than the difficulties mentioned above. It is the stigma of "pork barrel legislation" attached to flood-control measures administered by U. S. Engineers. If, no matter how unjustly, criticism and scepticism of that nature permeate the undertaking before it emerges from the blue-print stage, its progress will be hampered and perhaps entirely stopped by the people for whose benefit it was designed.

The Administration's proposal to establish independent authorities, on the other hand, is based on the ex-

perience with the TVA. This experience, although marked by inefficiency of organization, and an internal disagreement among its heads in the early years of existence, has won nothing but acclaim by the general public and high praise of the people of the Tennessee Valley.

If TVA has proved, financially and morally, to be a desirable yardstick for similar developments, then the Administration is fortified immeasurably in insisting on the creation of independent organizations for these great projects of our time.

JAMES S. SWEET
Douglaston, N. Y.

Construction in Latin America

Sir: As one of your readers who has worked several years in Latin America and who hopes to see more of the neighbors with whom he has lived, I read with much interest all articles and correspondence in *Engineering News-Record* devoted to work now going forward among them.

There is a tendency on the part of those to whom life and work in the countries of our neighbors is comparatively new to consider that nothing had been done before their arrival. Against this must be set an opposite tendency on the part of older men to feel that anything now proposed cannot be as well done as was done by them. A well-balanced sense of proportion properly employed will enable one who has had some experience in both periods to form a fair judgment on what used to be, as well as what is now proposed.

These thoughts are prompted by several recent contributions to the very interesting notes that frequently appear in *Engineering News-Record* about the various Latin American countries. Probably the subject most generally discussed is the Inter-American Highway and the Pan American Highway system. It is somewhat difficult to follow the various changes in route for the former through Central America and particularly in Guatemala.

Less than two years ago we were informed that the line through the highlands of that country, on account of various difficulties and climatic conditions had been abandoned by our military engineers in favor of a coastal route (*ENR* July 29, 1943, vol. p. 209). Later, after the Army withdrew, the line reverted to the high level formerly selected and over which the writer had made a motor trip as long ago as 1932. We now learn in your Dec. 21, 1944, issue (vol. p. 789) that another change of route has been adopted and one which it would seem would have been the obvious preference in the first place, namely a high-level connection with Mexico, instead of a descent from the Guatemala highlands to the Mexico lowlands at the international boundary. This change effects a saving of more than 100 km. by the simple process of recognizing that one side of a triangle is shorter than the sum of the other two. It is stated that the Guatemala portion of the line is over a high plateau but there is no explanation of how the route, which crosses several deep valleys that intersect this plateau, is to be revised to eliminate the heavy grades and hairpin turns on descents to the bottom of the deep and narrow valleys with the corresponding climbs on the other sides. I am sure that the engineers of Guatemala will improve the crossings of these deep clefts by widening the right-of-way, but the grades can only be lessened by increasing distances, which will hardly be an improvement from the point of view of long distance trucking—said to be one of the major uses for the route.

One of your comments in regard to expediting the Guatemalan work is to the effect that special efforts must be made because "as in other parts of Central America construction work can be handled effectively during less than six months out of the year. Heavy rains make the use of modern construction equipment impossible during the other six months".

It is somewhat surprising to learn that modern construction equipment is so delicate that it cannot be handled as was that of five to twenty years ago or even farther back, during which time I directed various types of construction in that area. The rainfall in Guatemala is not more serious during the wet season than that of El Salvador, Nicaragua, Panama, Colombia, nor Paraguay in all of which countries I have observed or directed construction during every month of the year. Naturally there were days of successive rainfall when operations were suspended, but the general progress was not seriously delayed.

Operations in constructing the Panama Canal, including not only the heavy excavation of the canal proper but also highway and other construction, was not suspended for periods of months or even weeks of wet weather. And four years ago in Paraguay it was possible to carry on road construction through the season of rains, except during brief periods of a few days. It is true that at Panama we used no gasoline or diesel machinery and depended on mules to pull our trucks, but shovels, construction trains and road rollers operated by steam, worked in all but the worst of the wet season. Moreover, in Paraguay bulldozers and tractor-drawn scrapers were operated throughout the year. Knowing some of the Central American and South American engineers I doubt whether they will lay-up their equipment for half of the year because of rains.

One other item of correspondence was of particular interest to me. I refer to Edward D. Hopkin's letter about early Peruvian levels and his discovery of hand levels used in pre-Inca days (*ENR* Dec. 28, 1944, vol. p. 813). I fear that I was negligent in failing to make this discovery when I was in that vicinity some 20 years ago, making surveys and studies for water supply and sanitation improvements for the Peruvian government. It may be that he is correct in claiming that the object shown in the first of his photographs was a hand level but it would be interesting to learn how the pre-Inca engineer was able to sight through the opening shown and at the same time observe the water level in the bowl above. Possibly it was filled to the brim and was assumed to be level if it did not spill on the observer.

My own thought is that the object in question was more likely to have been used at an ancient cocktail party and that probably the engineers of that time, who undoubtedly knew how to construct canals at proper grade to carry irrigation water for long distances, determined their grades by experiment or by the use of a float in a pail of water. I have a great regard for Mr. Hopkins' ability as a sanitary engineer, but I have my doubts as to the originality of discoveries made in museums that were founded long before any North American experts visited the land of the pre-Incas.

HENRY WELLES DURHAM
150 *East 39th St.*
New York, 16, *N. Y.*

EDITORIALS

VOLUME 134 NUMBER 20

May 17, 1945

Responsibility For Wise Spending

FEDERAL AID for planning of public works has now been made available to state and local governments, the money to be dispensed by the Federal Works Agency as "advances without interest" (*ENR* May 10, 1945, vol. p. 675). Under this arrangement recipients of financial assistance for the preparation of plans are pledged to repay the advance if and when the planned project goes into construction; no repayment is called for, however, should the project fail to go beyond the blueprint stage. This creates a very interesting situation because if a community is so minded it might be able to indulge in the luxury of planning for planning's sake alone without spending a penny of its own budget. Under the system established, the FWA is faced with a great responsibility in determining the legitimacy of requests for funds and their effective application. Since the primary purpose of the planning money is to aid those local governments that could not otherwise provide advances, it was probably not expedient to adopt a dollar-for-dollar matching basis of distribution. However, if funds were disbursed on a matching basis, twice as much planning could have been initiated. And what is even more important, the burden of selecting projects then would have been placed more directly on the local community instead of being passed to the Federal Works Agency.

Replanning Manila

AFTER HAVING the Philippines under our wing, as it were, for nearly half a century, Manila has come to be regarded almost as an American city. Now that much of it is in ruins as the result of war's devastating effect, impressions of two sorts are brought back by those who have seen it: Regret over the loss and destruction of treasured landmarks, or inspiration for a new and bigger city made possible by this opportunity for a fresh start in city planning. This latter impression, reported in last week's issue, carries a logical suggestion. It is only natural that there should be interest on the part of Americans in rehabilitation of Manila. Properly guided this can be a joint venture mutually beneficial to Filipinos and Americans. The time for planning is now, and if proper cooperation can be arranged while preliminary engineering studies are under way, there is no reason why the reconstructed city should not be modern in all respects, in keeping with the prosperous and productive future that can and should be planned for the Philippines.

Waterborne Virus Disease

RECENT REPORTS from the Army medical service in Italy reveal that infectious hepatitis, or camp jaundice, is a fifth disease which spreads much like typhoid fever. The causative agent is a virus, and the possibility exists, therefore, that jaundice may be spread by contaminated water. In its minor manifestations an attack of this disease is said to produce nausea and dysentery. Standard bacteriological tests now employed for the examination of water would not reveal the presence of this or any other virus. Hence, it might well be that the jaundice virus is the unrecognized cause of waterborne epidemics.

Engineers In City Service

"MUNICIPAL ENGINEERING PRACTICE calls for knowing at least a little about a lot of things." This is the modest view of P. L. Brockway, a veteran city engineer, who outlines his philosophy elsewhere in this issue. The "things" on which Mr. Brockway lays emphasis are those that define a man's ability to get along with others and to win support for the projects he knows to be technically sound. Too frequently academic training of engineers is so crowded as to prevent proper exposition of the human and personal qualities that form such an essential part of successful engineering practice. The appreciative appraisal of the nontechnical necessities of the engineer furnished by Mr. Brockway will be inspiring to all engineers.

Developments from Allied Fields

PROCESSES AND MACHINES developed in heavy manufacturing and kindred fields frequently find fully as useful adaptations in construction. A case in point is pressure welding of cross-country pipelines, described in this issue. Frequently the shop machines are cumbersome and, as in the example mentioned, may continue to be rather large when taken to the field. However, American construction men have the know-how to make almost any

machine portable to the extent that it can keep pace with advancing construction operations, in this case, fast moving pipeline crews. Undoubtedly there are many recent developments in manufacturing, some heretofore held secret for security reasons, that are adaptable to construction. Here is a fertile source for observant and aggressive engineers and constructors to gain advantage for themselves and aid in development of tools that will be valuable to all of construction. And there is no reason to hesitate about taking ideas from the manufacturing industry, for manufacturers of construction equipment have based many improvements on ideas developed in the field.

The Job Ahead

ENDING OF THE WAR IN EUROPE shifts the emphasis, but affects hardly at all the magnitude of the military construction task that lies ahead. To Army Engineers and Seabees, therefore, and in whatever theater of operations, President Truman's V-E Day theme of "work and more work" had unmistakable meaning. To us on the home front it will acquire more definite meaning as our knowledge of the future job increases.

Last week, for example, the Army announced its plan for demobilization and deployment, which indicated that the bulk of both men and material from Europe destined for the Pacific will pass through the U. S. This means the reopening, and in some cases the expansion, of training camps and, if as stated, 60 to 75 percent of the supplies now in Europe can be used against Japan, it suggests the need for additional warehousing facilities and perhaps even enlarged port works in this country.

The big jobs, of course, are still in Europe and the Pacific, and if the inclusion of Europe may at first seem surprising, consider these facts. The American zone of occupation is apparently going to be in southern Germany, roughly encompassing Thuringia, Baden, Wurttenberg and Bavaria, where there are probably a minimum of military barracks that we can take over. Therefore, we will have to build our own barracks for a half-million-man army. Whether Coblenz, Frankfurt or some other city is chosen for headquarters, we will find destruction that we must replace just for the well-being and efficiency of our own nationals. And then we must open up avenues of supply to our zone from the far-away seaports. To permit the French, the Belgians and the Dutch unrestricted use of their harbors and rail lines in building up their own devastated countries, an American supply corridor from Bremen is being considered. This suggests that the blasted port of that city may be the scene of an American construction job of real size.

Nor is such "postwar" construction all that Europe offers. Right now our Engineers are engaged in building recreation facilities and more comfortable quarters in France for troops bound for home, and in improving harbor works in Le Havre and other Channel ports for outgoing movements. Engineers from the E.T.O. may be needed in the Pacific, as official statements indicate, but there is still plenty of work for some of them right where they are.

The other side of the work picture, of course, and the really tremendous one, is in the Pacific. Whereas, in Europe, we had nearby, in England, a great ready-made staging area and supply base from which to launch our offensive, Japan and the China coast have no such highly developed, nearby facilities. One of our best jumping-off spots, the Philippines, is strewn with Jap-made wreckage. We must rebuild Manila and literally dig our way into her harbor before we can start operating from there. On Guam, our other great base of operations, we are building everything from scratch.

And then there is the Pacific's peculiarly characteristic problem—the necessity of building supply bases that include piers, warehouses, roads, fuel storage, etc., on island after island only to abandon them as the war moves on. It may well be that the speed of our progress against Japan will hinge upon our ability to build ship-unloading facilities rather than on having enough ships or on any of the other restricting factors of our two-front war. The important thing to note is that when the President said there was work to be done he was not indulging in rhetorical phrase-making as far as our military engineers in the Army and the Navy are concerned.

In the year preceding our Normandy invasion, 18 million tons of cargo were shipped to England. General Somervell is authority for the statement that "this must be duplicated in the Philippines before massive armies can be thrown against the homeland of Japan." In this successful duplication rests the job that is ahead. It is definite, urgent and of great size.

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Fast Bridging Keeps Railroads Close to the Battle Front

Waldo G. Bowman
Editor, Engineering News-Record
(By air-mail from the European Theater of Operations)

***Contents in Brief**—At the beginning of the Rhine offensive, supplies could be brought to within a few miles of the front lines by railroad. This was made possible by the speedy replacement of demolished bridges. However, bridging the gaps in the railway system in a race against time involved much more than ingenious erection methods, as described for the bridges at Hergenrath, Kornelimunster, Roanne Coo and Ramouchamps and for the bridges north of Ettlebruck. Behind the technical aspects of this epic of construction lies a tale of back-breaking toil and inspiring, effective leadership.*

Eschweiler, Germany, Feb. 25 (Delayed)—WHEN THE BATTLE to reach the Rhine began on Feb. 23, the commanders of the American armies—the Ninth, First and Third—could look backward at their supply lines with confidence, despite a spring-thaw road collapse that had turned the highways into quagmires. For, within 5 to 10 miles of their D-day positions, all along the 30-mile front from east of Aachen on the north to west of Trier in the south, were railheads. And railroad construction crews were even closer.

Not often is rail supply possible so far forward, so that the explanation of its availability here is of more than ordinary interest. In the main, it is a story of one of the highest-pressure bridge-building programs in history. And it is significant to note that the pressure cannot be relaxed until the offensive is successfully concluded, because every rail line that is "liberated" will offer a new batch of bridges to rebuild.

The situation that placed front-line soldiers, pushing off on the offensive that will be the climax and may well mark the end of the war, within sight of the smoke of railroad work-trains was not one leisurely arrived at. It might have been but for Field Marshal von Runstedt's counter-attack late in December that drove a 25 mile salient into our lines, and was not stopped and thrown back until the middle of January. By then our own demolitions on retirement, our subsequent bombings, and then demolitions by the Germans as they retreated, pretty well wrecked every railroad bridge that we had laboriously built, as well as many that had been undamaged previously. All had to be rebuilt, and not in three months as originally planned, but in one.

Fig. 1. Familiar scene to our military bridge builders in Europe at the start of every job. This is at St. Vith in the area of the Battle of the Bulge.

The locale and the task

The pattern of the main rail net in the battle area, between the Roer and the Moselle rivers, is a simple one (Fig. 2). Two lines, about 25 miles apart, run east to the Rhine, the one on the north joining Namur, Liege, Aachen and Cologne and the one on the south Luxembourg, Trier and Coblenz. Four north-south lines connect

these east-west main lines at 10 to 15-mile intervals between the Meuse and the Rhine, and there are a few cross connections between the north-south lines.

At the time the offensive began, three of the north-south lines were in our hands, and our forward positions were from 5 to 10 miles from the eastermost line, which joins Trier with Cologne. This line was a primary objective, and in order to be able to exploit it to the full immediately it fell into our hands, the feeder lines behind it had to be ready to go into service. Since all of these, back to the north-south Luxembourg-Liege line, as well as most of this line, too, were in the December-January battle area, they were badly wrecked. Here and on the lines east of Aachen were where the railroad bridging operations had to be pushed with all speed.

Adsec groups assigned

Assigned to the work were three of the construction groups attached to Adsec (Advance Section, Communications Zone), each group containing various types of units, dominated by an Engineer General Service Regiment. The regiments involved were the 332nd, commanded by Col. Helmer Swenholt, the 347th, commanded by Col. Harry Hulen, and the 341st, commanded by Col. Edward H. Coe. The first two of these regiments, during part of their 18 months in England, were trained to be railroad bridging specialists on the continent, while the 341st could draw on experience gained from 15 months on the Alcan Highway, 9 months on airbase construction in England and 8 months on general construction in France. Among them they could account for the bulk of the U. S. railroad bridging done in Europe since the invasion.

But while each of the regiments had handled rush jobs before, repairing of these rail lines on Germany's doorstep was unequalled for the high-pressure work that it demanded. On the main Luxembourg-Liege line, for example, in a 20 mile stretch above Ettelbruck, the 347th had 32 bridges totaling 2,000 ft. to build in three weeks in a mountain valley where highway access to the sites was always difficult and often impossible because several of them were isolated by tunnels.

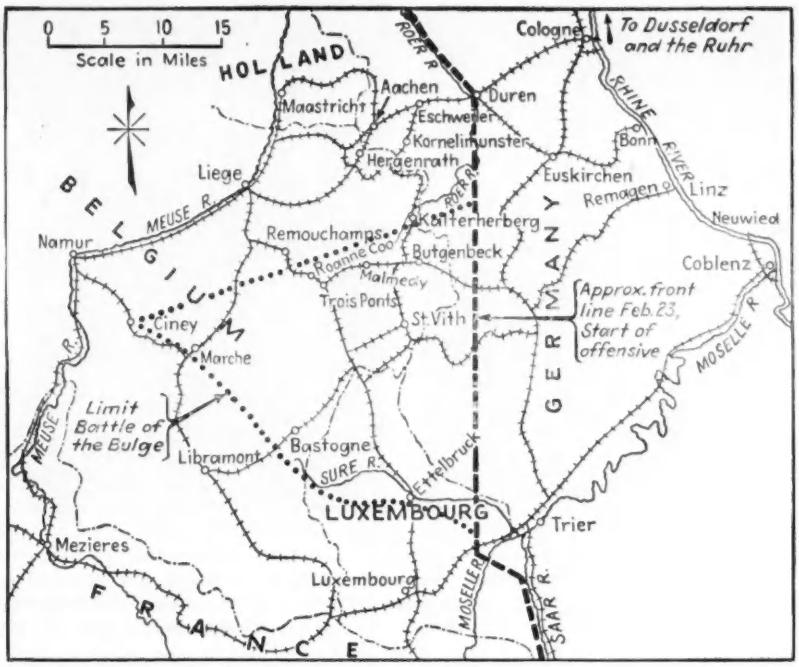
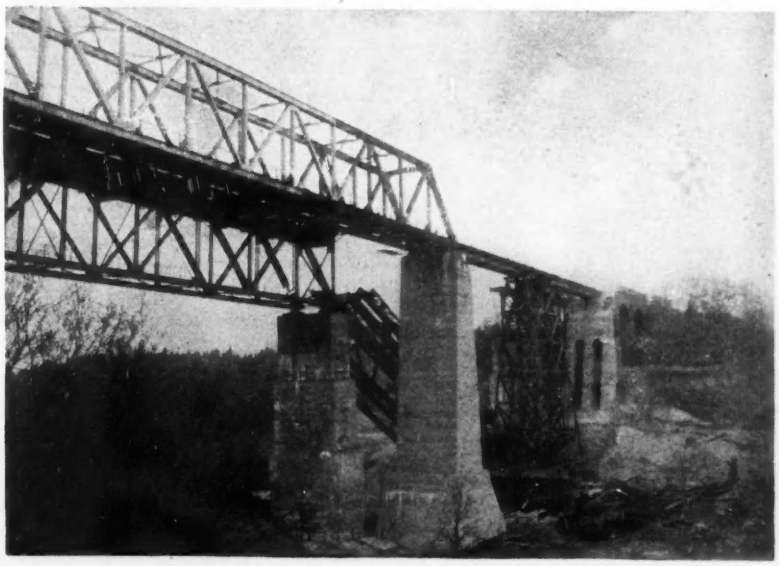


Fig. 2. Rail net in the area of the Rhine offensive. The German counter-attack of December, generally known as the Battle of the Bulge, overran a triangle, with its apex at Ciney and its base approximately from Ettelbruck to Kalterherberg, in which all significant bridges were thoroughly wrecked.

Farther north, beyond the town of Trois Ponts, the 341st had two long-span structures, and the 1058th Port Construction and Repair unit, commanded by Lt. Col. J. D. Hillyer and a part of the same group, had another to build before the line could be opened. The 341st also had bridges on the cross lines in the St. Vith-Malmedy area and on the minor line north to Eschweiler through Kalterherbreg and Kornelimunster. Finally, the lines in the vicinity of Aachen were the responsibility of the 332nd



332nd Engineers, Builders

Fig. 3. Tallest Engineer-built bridge is at Hergenrath, Belgium, near Aachen, Germany, where a wrecked 220-ft. through truss was replaced by three beam spans, including one on the 91-ft. high supporting tower.

332nd Engineers, Builders.

Fig. 4. Erecting the Hergenrath bridge. Left, completed tower equipped with gantries to aid in launching and setting the beams. Center, two beams joined into a unit by welded bracing are being launched from the existing truss span and pulled to the tower by a line running to a hand winch. Right, beams reach tower gantry which will support them as they are pulled on to the abutment. Other beams will be launched beside them to complete the bridge.

regiment; eighteen jobs in the 8 miles between Eschweiler and Duren on the Roer River giving some idea of the magnitude of its task.

No officers or troops have worked longer hours or with greater devotion and enthusiasm on an assignment than did those of these Engineer units and of the Adsec headquarters staff who were concerned with it. Each of the regimental headquarters was in a train, as were also a number of the company headquarters at the job sites, so that when a man was awake he was at work. Night shifts were common even though blackouts had to be observed. And, as a result of all of these efforts, every construction schedule was met.

Probably some of the enthusiasm for the work was engendered by the knowledge that every bridge completed brought the greatly desired job of bridging the Rhine that much nearer. But much of it also stemmed directly from the jobs in hand, many of which presented challenging problems whose solutions are well worth recording.

332nd Engineers, Builders.

Fig. 5. Long-boom crawler crane swings concrete from mixer at right (off the picture) up to crew pouring abutment pads for new girders of bridge at Eschweiler, Germany. Steel tower is all welded. Meter beam spans will be used.

Viaduct tower span notable

A case in point is a high bridge at Hergenrath, south of Aachen, built by the 332nd. The original crossing consisted of two parallel bridges, one of deck-truss and one of through-truss type, (Fig. 3). One 220-ft span of each had been dropped by demolition charges, but it was only required that one track be put back into service. Since the rolled girders that were available for the replacement structure could not be used for spans of much over 90 ft., there would obviously have to be one new support, and possibly two, to bridge the opening. And since the new sup-

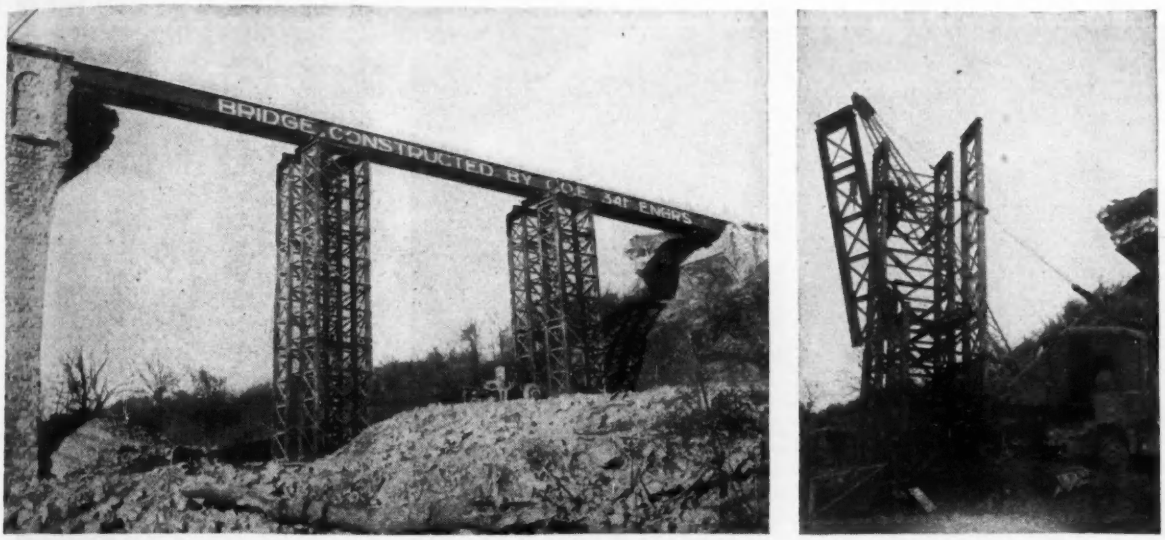


Fig. 6. First big bridge in Germany, 224-ft. total length, started Dec. 1, completed Dec. 26, located at Kornelimunster. It represents first use of steel towers assembled from standardized, prefabricated welded panels and bracing developed by the 341st Engineers. Right: Truck-crane erects one of the towers.

port would have to be high in any case, there was an advantage in putting it on the alignment of the deck truss structure where it could be somewhat lower than otherwise.

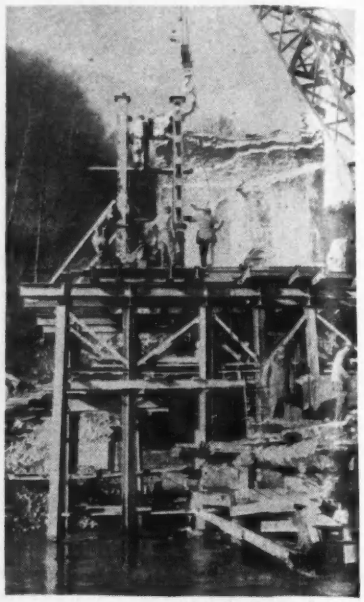
The demolished deck truss in falling, however, had struck the top of its pier and pushed it out of plumb, actually fracturing it near the bottom. Decision had to be made to repair this pier and build a lower steel pier or to go over to the through truss bridge where a higher steel pier would be required. Although such a pier would have to support the track nearly 100 ft. in the air, and would thus be higher than any yet built in the military bridging program, the decision was in its favor. Then, since a high pier would have to have substantial plan dimensions, the solution of the span arrangement was at hand: Make the new pier into a 40-ft. long tower span and use 90-ft. beam spans at either end; this would require using a single 32-in. beam under each rail in the tower span and three meter beams (39.37 in. deep) under each rail in the long spans, a simple and economical arrangement.

The tower (Fig. 4 left), 91 ft. high, 40x40 ft. at the base and 10x40 ft. at the top, is supported on seventy 10-in. steel H-piles driven to 20-tons bearing, and braced in bents under each line of columns. It was prefabricated by welding and erected with welded field joints, members being lifted into position by a crawler crane with a 70-ft. boom equipped with a 20-ft. extension found in a German supply dump. Rain, which often froze on the steel, made this a hazardous and spectacular operation.

Even more spectacular, however, was the erection of the superstructure by launching the 90-ft. beam spans. As previously stated, each of these spans was composed of six meter beams, in groups of three under each rail, which were joined by welded sway bracing. It was decided to launch the two inside beams and the sway bracing as a unit first, then to push the remaining beams over this support to their positions, all to be lowered to the bridge seats by 5-ton-chain-hoist gantrys set over the several supports.

341st Engineers, Builders

Fig. 7. The bridge at Roanne Coo on a 4 deg. curve consists of three 86-ft. spans, each incorporating five lines of meter beams supported on towers of British light steel trestling. These, in turn, rest on foundation towers made by capping and bracing the steel H-section piling.



341st Engineers, Builders.

Fig. 8. The beams for the Roanne Coo bridge were launched on a tangent, cut apart when they were in place and jacked over to form the curve. Right: The trestle towers were set on a pier of steel H-piles topped with a 3½-ft. deep grillage. Crawler cranes operating from a temporary construction bridge handled the foundation and tower steel.

Accordingly these launching units, for both 90-ft. spans, were assembled on the existing bridge, welded together end-to-end and joined to another similar unit (made of two of the other 90-ft. beams and some temporary bracing) to serve as a counterweight. The total length of steel to be handled in the launching was, therefore, 270 ft.

Pulled by a line from a hand winch, the beam assembly moved forward on cribbed-up rollers set on the several supports until the end reached the far side. Then, this far span was cut loose, and lowered to its seat, while the remaining span was pulled back across the tower until it was in position over its bearings when it, too, was cut loose and lowered.

In completing the bridge, the counterweight unit of two beams and bracing was first rolled out onto the near span, the bracing cut loose and the beams lowered by the gantry hoists to each side of the beams already in place. Two more beams were needed for this span and four more for the far span, and all of these were rolled out singly and lowered by the gantrys. The two 32-in. beams for the tower span were brought out in the same way. And as a final improvisation, to meet the scheduled completion date, the ties and track were preassembled on the bridge and moved into place by a straight pull from a crawler tractor aided by some grease on the bridge beams.

341st Engineers, Builders.

Fig. 9. Trois Ponts bridge in Belgium uses maximum length meter beam rolled, 95 ft., in maximum possible span length, 92.5 ft. Note wreckage of previous span we built in December and Germans blew up in January.

Ingenious and bold, this bridge is one of many similar but less spectacular ones that have been built on this main line to Cologne. One of them, in fact, located at Eschweiler (Fig. 5) set the precedent for the tall welded towers of the Hergenrath structure, although its 32-ft. high pier is merely a support and not a span.

Engineer-developed piers

Steel towers of somewhat similar type, but built of standardized units of columns and bracing that can be combined into structures of various heights and base widths, have been developed by the 341st Engineers (Master Sergeant Joseph A. Cundari being the actual designer) and

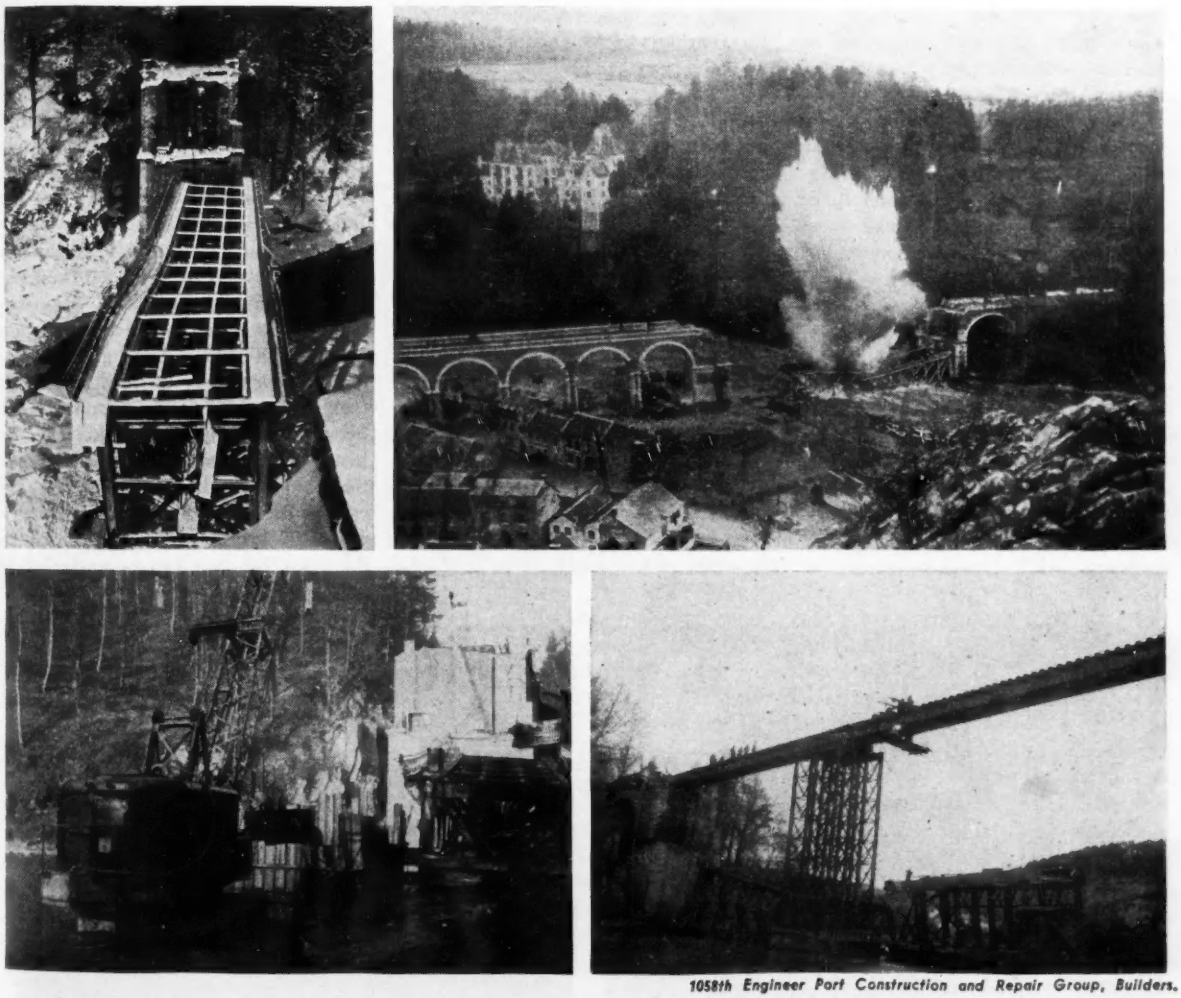
initially used by them on the first large bridge built in Germany, located at Kornelimunster, south of Eschweiler. The basic element is an x-braced bent, 5 ft. wide and 1, 2, or 4 panels high, that is, 5, 10 or 20 ft., approximately. The column sections of the bent are 10-in. H's, while 8-in. I's are used for the struts and 4x4x½-in. angles for x-bracing. Combinations of the three sizes of bents permits a wide variety of tower heights and additional variations can, of course, be introduced by using grillages of different depths.

As shown in Fig. 6, a tower made up of these bents as transverse faces, and panels of K-bracing as longituginal faces, is used under each girder of the Kornelimunster bridge. The two towers forming each pier are tied together by light, transverse angle struts. The tallest of the piers is 11 panels or 55 ft., about the limit with a base width of 15 ft., *i.e.*, two 5-ft. wide towers separated 5 ft. When a broader base is required, however, it is readily provided by merely adding a bent of the necessary height on either side, thus increasing the width to 25 ft. Usually such side bents are 10 or 20 ft., 2 or 4 panels, high. On the Butgenbeck bridge, in the St. Vith-Malmedy area, for example, such a "stepped base", in which the outside bents are 4 panels high, is used for a 70-ft. tower.

Other interesting characteristics

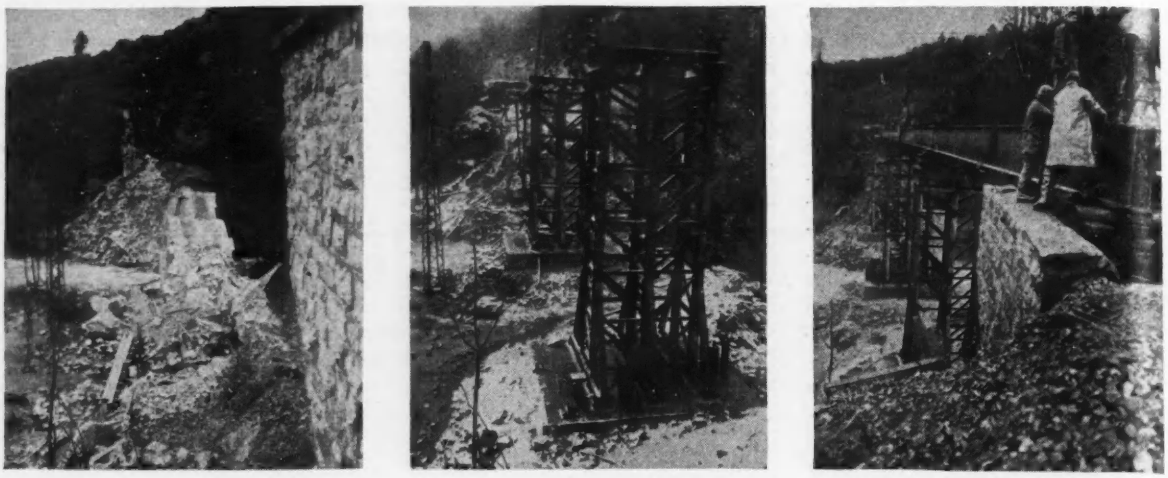
In addition to its tower design the Kornelimunster bridge has other interesting characteristics. Originally it consisted of eight stone arches of 57-ft. span, three of which, including their two supporting piers, were completely destroyed, leaving an opening of about 180 ft. to be bridged. The replacement spans used were one of 64 ft., requiring two meter beams under each rail, and one of 51 and one of 55 ft., requiring only one meter beam under each rail.

This, however, was not the complete bridge, as another steel span was carried over the first standing stone arch (to the left in Fig. 6), so that there would be no thrust on the first pier. The alternative would have been to install inclined braces from the ground up to the springline of the arch, a time-consuming operation. The steel span over the stone arch consisted of two 32-in.



1058th Engineer Port Construction and Repair Group, Builders.

Fig. 10. Difficult job in a beautiful setting resulted from the necessary reconstruction of the Remouchamps viaduct. First, the part of the old wrecked 200-ft. truss (upper left) that was in the way of new pier construction had to be cut loose and tipped to one side by a single explosive charge (upper right). Then cofferdam had to be driven (lower left), pier built and beams launched with the aid of a cableway. The completed bridge is shown at the lower right.



341st Engineers, Builders.

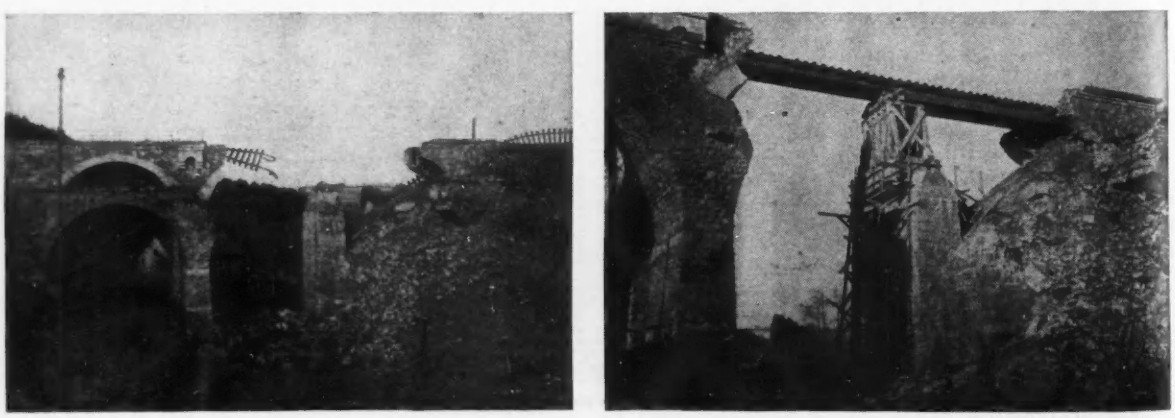
Fig. 11. Three periods in the rebirth of the 265-ft. bridge at Malmedy: as the Germans left it; with the welded steel towers complete; and preparing to lower a girder of two meter beams to the bridge seats. The beams are in this raised position because they were launched from the level of the approach track.

beams under each rail, supported on concrete pedestals poured on top of the stone piers.

The towers of the bridge were erected by a truck-mounted crane with a 40-ft. boom, as shown in Fig. 6 where a 5-panel bent made up of a standard 4-panel and a 1-panel unit, which were welded together on the ground, is being lifted. Three portable electric generating sets were used to provide current for welding the bracing and the splices.

Erection of the girders was performed by launching as a cantilever from one end. An entire four-span length of 232 ft. was welded together, set on rollers on a track laid on the existing stone arches and pulled out over the gap by a tractor on the far abutment, while another tractor at the rear served as an anchor. This was the general scheme, but there was an interesting variation introduced because, as pointed out, the far span has two meter beams under each rail while the other two spans have but one. It was not possible to cantilever two girders from a single girder, so only one of the far-span girders was pulled across at a time. When the first one was across, it was cut loose at its welded splice and moved to one side while the remainder of the launched girder (for the other two spans) was pulled back to the starting point where the second girder for the far span was welded to it, and the launching process repeated. The whole procedure was again repeated for the girders under the other rail.

Several of the other notable bridges of the 341st are shown in the accompanying illustrations, and it is not necessary to supplement the caption information given with them. However, the bridge at Roanne Coo (Fig. 7), north of Trois Ponts on the Luxembourg-Liege line, deserves special mention for several reasons, one of which is that its three 86-ft. spans are framed with five lines of meter beams, two under each rail and one on the centerline. Such an arrangement, theoretically correct for spans from 80 to 90 ft., is seldom used because it requires special care in installing the bracing and the cross ties to assure that the center beam carries its share of the load. Usually spans in excess of 75 ft., which is the limit for two beams under each



341st Engineers, Builders.

Fig. 12. Before-and-after scenes of the bridge at Kalterherberg, on the Belgium-German border, illustrates common and simple method of repair if part of old pier is standing. Total gap here was 168 ft.

rail, are framed with three beams under each rail, even though there is some wastage of steel.

Launching 256 ft. of beams

Erection of the Roanne Coo girders was accomplished by welding the three spans together in a continuous 256-ft. length and launching from one end, a bold procedure both because of the span lengths and a height of 75 ft. above the valley. An interesting feature is that the bridge is not on a tangent, so that the beams, which were of course launched in a straight line, had to be cut apart after they were in place and jacked over to form chords of a 4-deg. curve (Fig. 8).

The piers of the Roanne Coo bridge are also somewhat different from others, consisting of a 40-ft. British LST (Light Steel Trestling) tower set on a pier of steel H-piles extending 22 ft. above the water and tied together with welded bracing (Fig. 8); of a 3½-ft. grillage on top of the piles, and another on top of the tower. When the depth of the bridge span is included the 75-ft. height is accounted for. Although satisfactory piers after they were completed, considerable difficulty attended their construction because the H-piles rotated during driving, ending up with their axes orientated in various directions, thus requiring that every bracing member had to be "tailor made" both as to length and end connection. Readily accomplished with gas cutting and arc welding equipment, the operation of installing the bracing was, nevertheless, time consuming.

Spectacular mountain valley job

Farther up this same rail line in the same steep-sloped valley, the 1058th Port Construction and Repair Group had a similar but more difficult bridging operation to carry out. Whereas the debris of the Roanne Coo bridge was merely brick rubble, easily pushed out of the way or even worked in, this Ramouchamps bridge wreckage was a steel truss of something over 200-ft. span, dropped squarely in the way of any new pier construction (Fig. 10).

Too heavy to be dragged out of the way and too big to be cut up into manageable size pieces in the time available, the truss was broken in two by blasting charges (after the top chord and the diagonals had been cut with a torch) and the half that was in the way neatly tipped over on its side at the same time. It was then possible to build a low timber trestle out to the pier site to serve as a working platform for a 20-ton crawler crane with which sheetpiling was driven for a 22x26-ft. cofferdam about 11 ft. deep in which a concrete pier was poured in the dry. Surmounting the pier, a prefabricated steel tower was erected to support the superstructure 60 ft. above the water.

Perhaps the most distinctive characteristic of the Ramouchamps bridge is the manner in which it effects a crossing nearly 200 ft. wide with only one pier and beams of a maximum length of 95 ft. A tower span could have been used as at Hergenrath, but instead a continuous beam 200 ft. long was made by welding a 10-ft. piece between two 95-ft. lengths. Supported on a shoe over the center pier, the bearing-to-bearing lengths of the two spans into which the beam is divided are 97 ft. 10 in. and 99 ft. 6 in. Three beams are used under each rail.

Erection of this bridge differed from usual procedure in that a cableway was used, towers of prefabricated steel bents being set up on the existing masonry piers at either end

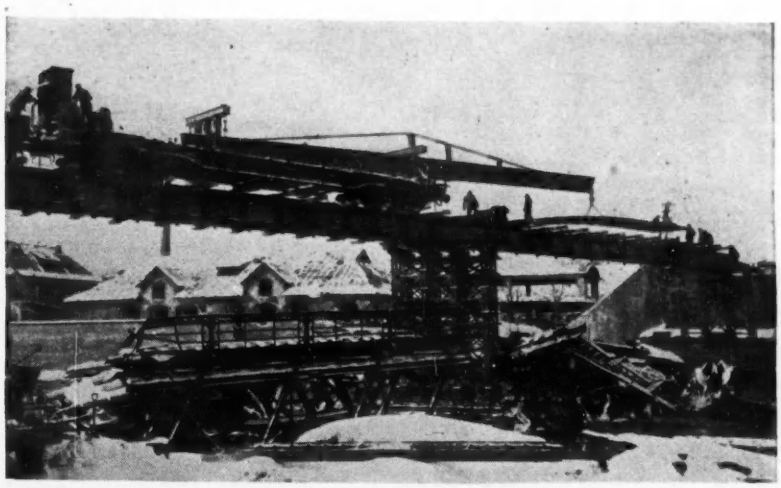
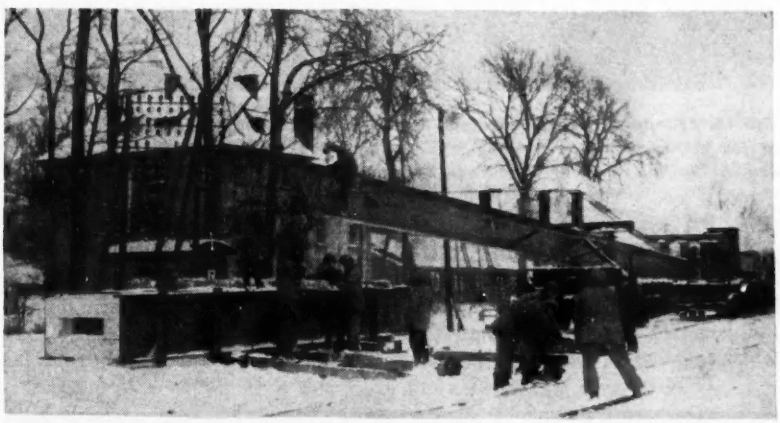


Fig. 13. "Long Tom", job-made crane, designed and built by the 347th Engineers for installing girders and, as shown here, preassembled sections of track. Boom is a 95-ft. meter beam, and lifting power is supplied by a hand winch mounted at the rear of the flat car. The LST (light steel trestling) piers had, of course, to be erected by other means.

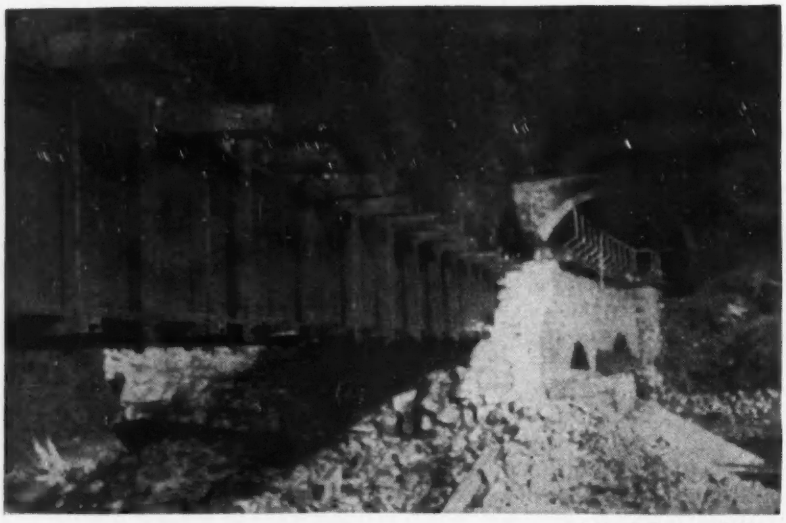


347th Engineers, Builders.

Fig. 14. A 40-ft. span, made up of two meter beams and special sway bracing consisting of timber spreaders and channel iron yokes, ready to be picked up by Long Tom crane, carried to the bridge site and deposited on its bearings. Weight is 11 tons, about the capacity of the rig.

Fig. 15. Troops of 347th Engineers prefabricating timber spreaders to be used in lieu of welded sway bracing in 32 bridges that were built at rate of 1½ a day as the line north of Ettelbruck in Luxembourg.

(Fig. 10) to support the 1-in. dia. cable from which the lifting hook was operated by a 10-ton drum hoist. Initially used to move sheetpiling and concrete to the river pier, the cableway came into its own on superstructure erection. Here it first set the short steel towers that were placed on each abutment to carry the ends of the bridge and then topped out the part of the center pier that the crane could not reach from its working platform. Then, when a 200-ft. long continuous beam for the span was assembled on the deck of the existing bridge, the hook was attached to one end, and the beam pulled across in a matter of minutes. It was a successful and spectacular operation befitting the setting on a high viaduct across a swift mountain stream, with a handsome old Ardennes castle in the near background.



347th Engineers, Builders.

Fig. 16. Meter beam span on Ettelbruck line showing sway bracing yokes—vertical channels tied across bridge by threaded rods; they react against timber spreader frames placed between the girders. Note also how track is anchored with channel-and-rod-yokes.

Building 1½ bridges a day

Perhaps the most punishing bridge building schedule of the preparatory program for the Rhine offensive was handed to the 347th Engineers—the restoration in one 25-mile stretch north of Ettelbruck of 32 bridges in three weeks, or 1½ bridges a day. To make matters worse, less than half of the bridges could be worked on simultaneously because the mountain valley location denied access to many of the sites except by rail; in one case as many as three bridges had to be completed before any substantial work could start on the next one up the line. The roads that were available in the early stages of the job were also under periodic shellfire, which complicated the situation.

All bridges were of meter beam type, the number of spans varied from one to three, LST framing was used for piers where they were required, and span lengths were from 40 to 80 ft. A total of 2,000 lin. ft. of structure, using 800 tons of steel, was involved in the 32 bridges.

Three controlling factors

Many factors, not all of which can be discerned easily, combine to account for the success of such an operation, but in this case there were three that were controlling: the use of a special flatcar-mounted, job-made crane, christened "Long Tom", for launching the deck beams; the substitution of yokes of steel and of timber spreaders for the usual welded steel sway bracing; and tremendous willingness and ambition on the part of the officers and the men to finish an "impossible" job on time.

The launching rig is illustrated in Fig. 13, and it will be noted that the boom is merely a meter beam, allowed to project over the end of the car for about half of its 95-ft. length. Anchored to the car at the back end and at the middle, the beam is also trussed top and sides with cable hog-

backs to give it added strength and stability. From a single-drum hand hoist mounted at the rear of the car, cables run forward to a 4-part block-and-falls to which the lifting hook is attached. In operation, a beam is hung from the hook at a railway supply siding, the launcher is pushed out to the end of the last completed span, and the beam is set down in the next span.

As presently built, the launcher can handle about 12 tons, so that on the smaller bridges it is possible to preassemble a whole span—beams, bracing and sometimes track—and set it in position complete. Such a preassembled span is shown being handled in Fig. 14. There, it will also be noted, that the "sway bracing" consists of spreader frames made of heavy timbers set between the two track beams, which are pulled against the frames by yokes of steel channels and threaded steel rods. Although obviously an emergency detail, it provides a satisfactorily rigid bridge, and manifestly saves time over the use of welded bracing.

Evidence of determination

To assay the third factor contributing to the success of the job, namely the spirit of the men, is always more difficult; yet, in this case, there is available one piece of evidence that is significant—a letter that the commanding officer, Col. Harry Hulen, wrote to his wife after the regiment had completed the first crossing of the Seine on Sept. 6, and that his wife returned with the recommendation that the men be given copies. It said, in part:

"Last night we finished it. Georgy will get what he needs. [The reference is to Gen. George Patton, a classmate at West Point of Colonel Hulen—Editor]. Ahead of time at that. I'll never forget the long weary hours. Standing high up over the water. Pitch blackout. Raining ceaselessly. Gusty wind. Weary bedraggled men slogging on after two long weary homesick years in foreign lands, tight-roping out on the slender cat-walk-like steel. Dropping 150-lb ties. Hook-bolting them down. Then a gang of 16, each lifting a hundredweight, carrying a rail. Dropping it with a startling clang. A necessary momentary glare as the torch cuts it to fit. The bolter-uppers. The screw spike men twisting dimly away. The cat eyes of the engine, tiny-blinking a hundred yards to the rear, ready to draw over the test load of 20 overburdened cars. The inspectors crawling on their wet bellies, examining by touch every bolt, every spike.

A dimmed flashlight waves a little, and the pilot train creeps across the bridge exactly at midnight as the track crew steps back among the girders. Some of them wave and shout. Some smile to themselves maybe, in the darkness. And some must be silent from weeping from the way they draw in their breath, crowded there in the darkness by your ear. Maybe they weep from exhaustion, maybe they weep because they know that for many miles to the rear there is train after train nosing one another up. And that the irresistible might of America will roll day and night across those slender ribbons of steel.

Georgy will get what he wants. And he'll get it two days sooner than promised. A week sooner than expected. Hitler, too, will now get what he has been asking for. Those men there in the rain on the bridge know that it is so—through their sacrifice of sleep, through their own backbreaking toil long after Nature began to scream for a halt. Through that, too, they know that they have shortened the war exactly those two days."

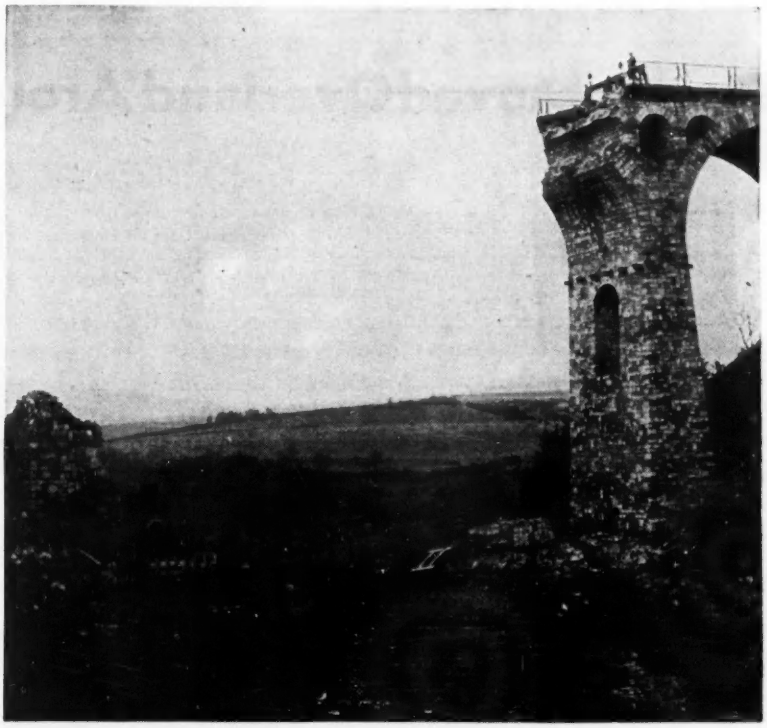


Fig. 17. Concreting a foundation for a 70-ft. welded steel tower pier on which two 81-ft. meter beam spans will be supported to close an opening caused by the demolition of three 54-ft. masonry arches in this viaduct at Butgenbeck, Germany. A corduroy road is under construction in the foreground.

Such a letter reveals the presence of sympathetic, inspiring and effective leadership, which can account, at least in part, for the will to succeed, the remainder resting with the company commanders and the men themselves, a fact that was demonstrated by an incident that occurred just after the Ettelbruck line was opened. One company, commanded by Capt. N. G. Cots, had moved over onto the Luxembourg-Trier line to be ready to follow up the gains that Gen. Patton's Third Army was expected to make. In the meantime, in the week ahead, there were three bridges, two of 40-ft. span and one of 50 ft. that needed to be built.

About 10 p.m. the phone rang. It was Third Army headquarters. Ammunition was needed up ahead, the roads were impassable because of mud, and could the Engineers have those bridges finished by tomorrow night at this time?

Not even a reconnaisance of the sites had been made, but the bridges were promised, and 22 hours later they were delivered, marked by the passage of an ammunition train just as the last bolts of the sway bracing yokes were being tightened. Two days later the Third Army captured the key rail center of Trier, after a sharp artillery bombardment, and continued on its way to the Rhine, thanks to the fact that fast bridging by hard working and enthusiastic Engineer officers and troops had been keeping the railroads, and hence the supplies, close to the front lines.

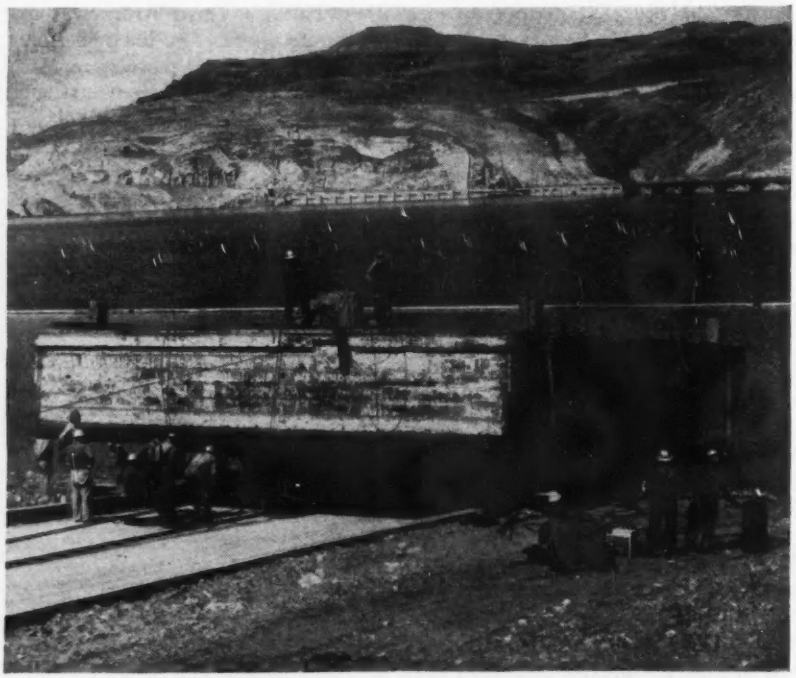
Barges Moved Overland Around Coulee Dam

Fred J. Sharkey
Office Engineer, U. S. Bureau of Reclamation
Grand Coulee Dam, Washington

***Contents in Brief**—Large barges, 40x80 ft. and weighing 150 tons, were pulled out of the reservoir above Grand Coulee Dam in a rebuilt trailer, transported two miles over steep slopes and put back into the river below the dam. Savings of $20,000 were achieved by this alternative to building new barges, and the gear is available for future transfers.*

BARGES IN THE RESERVOIR upstream from Grand Coulee Dam were needed downstream for work in connection with repairs to the spillway bucket (*ENR* July 13, 1944, vol. p. 41). Although barges were available they were as large as 40x80 ft. and weighed up to 150 tons, and handling equipment adequate to move such a load was not procurable in the area. The alternative to moving the barges was construction of five new units—requiring over 300,000 b.ft. of lumber, 34 tons of fastenings, a ton of oakum and 175 gal. of red lead. In addition, a great deal of lumber and several tons of steel would have been required for launching ways, a critically short manpower situation would be made worse, and the time necessary for building the barges would have delayed essential work.

While pondering over this situation, the equipment division of the chief engineer's office of the Bureau of Reclamation in Denver discovered that a 200-ton trailer, used at Boulder Dam for transporting penstock sections, was available but had had hard service and could not be considered of adequate size. The trailer was accepted, however, as the best solution to the problem of providing the necessary barges and was shipped to Grand Coulee Dam for reconditioning in the government shops.



Barges up to 40x80 ft. in size were hauled out of the reservoir above Grand Coulee Dam and transported overland around the structure.

Trailer from Boulder Dam rebuilt

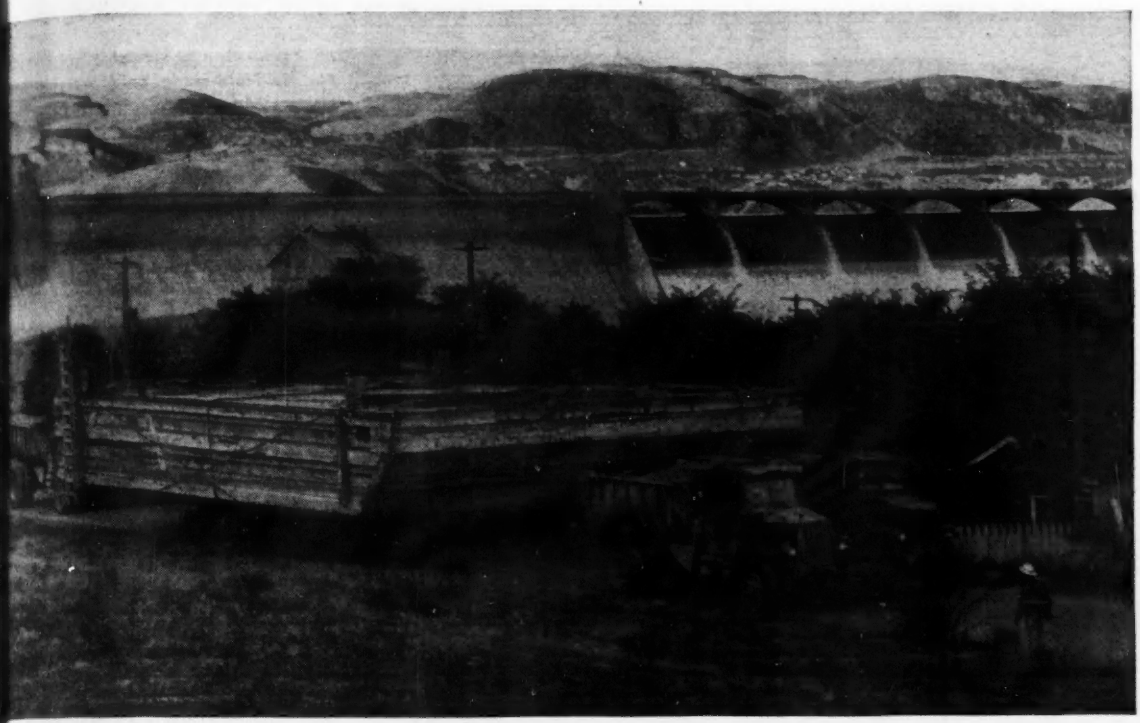
The trailer had overall dimensions of 22x38 ft. but centers of the wheel trucks were about 6 ft. from each end of the frame, leaving a longitudinal distance of only 26 ft. between supports. For an 80-ft. barge this would require an overhang of 27 ft. at each end. For the safety of the barge, as well as the stability of the load in transit, the distance between load supports was lengthened by installing cross beams at 32 ft. 2 in. apart, placed symmetrically with respect to the wheels. In this location the supports were near transverse bulkheads in the larger barges, and thus relieved the stress on the bottom sheathing of the barge.

Considerable reinforcement of the side girders of the trailer frame was necessary to resist stresses caused by supporting the load fore and aft of the trucks. A 14-in. H-beam, reinforced with welded-in-stiffeners and padded on top with discarded rubber belting, was bolted across the top of the side girders, to provide support for the barge at the extremities of the trailer frame.

Concrete ramps on bank

Ramps of concrete, reinforced for the heavy load, were built in the reservoir area and in the river downstream from the dam. Both ramps were constructed to a 13-percent slope, approximating that of the natural shore. Because of the grade of the ramp, about 14 ft. of water is required over the ramp floor at the down-hill wheels of the trailer to permit loading or unloading a barge.

The ramps were built when the water was low; the one in the reservoir



...e trucks ahead pulling and two behind pushing or holding back, as terrain required, moved this 150-ton load around ...rand Coulee Dam. A specially rebuilt trailer, previously used at Boulder Dam, was used.

...tends to 20 ft. below normal high ...ater level and that in the river below ...e dam to 23 ft. below the highest ...ater in 1944. However, the highest ...il water of 1944 was 10 ft. below ...e normally expected maximum for ...at year.

A hoist was installed at the head of ...ch ramp for handling the trailer ...n the steep slope. In preparing to ...ad a barge, the trailer is let down ...ong the ramp until the high end is ...bmerged to a depth sufficient for ...e barge to be floated over the trans...rse beam at the forward end of the ...ailer. Position of the transverse sup...rting beams is indicated by light ...el angle tell-tales that are welded ...the ends of the beams and project ...ove the water when the trailer is ...loading position.

The barge is maneuvered into posi...on over the trailer with a tugboat ...d the hoist used to pull the trailer ...ry slowly up the ramp, the tug main...ining control of the barge until the ...pper supporting beam contacts the ...rge and starts to lift it from the wa...r. At this point the hoist is stopped ...d a check made of the position of ...e barge over the trailer, after which ...e tugboat cuts loose from the barge and the loaded trailer is hauled slowly up the ramp.

The trailer originally was equipped with air brakes and steering apparatus, operated by oil cylinders, at each end of the unit. Before starting to haul the loaded trailer from the water, equipment is installed on the deck of the barge and connected to the trailer with flexible tubing to permit operation of the brakes and steering apparatus from the barge deck.

Trucks used fore and aft

After pulling the loaded trailer up the ramp to the level roadway with the hoist, usual practice is to attach two loaded 12-cu.yd. trucks in front to haul the barge and two more at the rear to push or hold back as might be necessary for safety. The roadway for part of the distance over which the barges had to be hauled was in a side-hill cut in solid rock. The rock face on the up-hill side was not excavated back far enough from the center of the roadway for the barge to pass if loaded symmetrically on the trailer so the larger barges were loaded 2 ft. off center thus avoiding considerable rock excavation.

Little difficulty was encountered in moving the barges, evidenced by the fact that in one 8-hr. shift a barge was loaded and hauled from the water at the reservoir, transported about two miles with a drop in elevation of about 350 ft., and unloaded into the river.

Provision of the trailer and ramp installations has made it possible to transfer rapidly almost any floating equipment from reservoir to river or vice versa, as may be desired. Beside the saving in time, labor, and critical materials, this installation already has resulted in a direct saving to the government of about $20,000, the difference between the estimated cost of building new barges and the cost of the method used.

Details of the ramps, reinforcement of the trailer frame and other parts of the installation were prepared in the Grand Coulee project office. Concrete work was performed under the direction of B. A. Hall, field engineer. Installation of hoists and rigging and revamping of the trailer were under direction of James E. Wallace, master mechanic, and hauling was supervised by W. C. Rice, superintendent of construction for the Bureau of Reclamation.

Fig. 1. Field-made cold wrinkle be made 24-in. dia. pipe conform terrain.

Pressure Welding On a 24-in. Gas Pipeline

***Contents in Brief**—To carry natural gas from Texas to near Pittsburgh a 44-in. dia. pipeline was built in 10 months. For the first time on a major pipeline installation "solid phase" or pressure oxyacetylene welding was used extensively for joining the line, resulting in a reduction in the time, equipment and manhours required for construction. Aerial crossings of major rivers are unique.*

BUILT WITH THE LEAST FANFARE of any major pipeline, the Tennessee Gas and Transmission Company's line from Corpus Christi, Texas, 1,265 miles to Cornwell, W. Va., not far from Pittsburgh, was completed in ten months. The 24-in. dia. line carries more than 200,000,000 cu.ft. of natural gas per day at an operating pressure of 750 psi., maintained by seven compressor stations. Rush construction of the line was necessary to meet anticipated shortages of gas fuel in the Appalachian area during the past winter. Cost of the line was $54,000,000 and it required 25,000,000 man-hours of work.

Probably the most significant construction innovation on the line was pressure welding of 320 miles of the 24-in. line. Another development was cold wrinkle bending of the big pipe in the field. River crossings and the method of cleaning the pipe prior to use also are of interest to construction men.

The line begins near Corp Christi, Texas, where it takes was gases from recycling plants. The pi follows a generally direct cour northeast through Louisiana, Arka sas, Mississippi, Tennessee, Kentuck and into West Virginia. There a 1,180 miles of 24-in. pipe and, beyo a point where some gas is taken fr the system, 85 miles of 20-in. line the West Virginia end. The line welded throughout its entire leng

Some 700 miles of the right-of-wa required clearing, part of it involvi major timbering operations. Abo 400 miles traversed rocky areas wh some of the remaining distance w swampy. The line crosses 67 stream with 17 submerged and six aeri crossings of major rivers, while t Mississippi was crossed on a highw bridge. Nearly 300 highway and railroad crossings were necessary, made underground. Crossings of ra roads and paved highways was do by drilling under the roadway a shoving the pipe through.

Completed under pressure

The pipeline was constructed at speed never before attained on maj installations of this nature. On about 400 days elapsed from start the project until gas was deliver 1,265 miles away. Welding on t line was started on Jan. 10, 1944, a completed Oct. 30 of the same ye with gas delivered on Oct. 31. I mediate delivery after completion the line was accomplished by keepi the line "packed" with gas as it a proached completion so that the s days normally required for filling t line were saved.

This unprecedented construct feat was accomplished under n major pipeline contractors with t steel erection firms handling the aeri river crossings. At one time "spreads" (organizations for all the activities of laying pipe) w working on the line.

All of the usual pipeline machi were utilized on the project trenchers, backhoes, cranes, dragli and crawler tractors, many of the l

er equipped as side-boom cranes. New to pipe line clearing was use of circular saws mounted on tractors nd arranged to cut horizontally for elling trees. A hydraulic arm on the ractor kept a constant pressure, away rom the rig, pushing on the tree to revent pinching the saw or permitng the trees to fall over the rig.

Two kinds of pipe were used.

Pipe used for the project was of wo kinds: Seamless 24 or 20-in. OD ipe of 91-32-in. wall thickness had a inimum yield point of 45,000 psi. nd a minimum tensile strength of 0,000 psi. Electric-welded pipe used as 24-in. OD, with ¼-in. wall thickess, a yield point of 50,000 psi. and inimum tensile strength of 70,000 si. Pipe was delivered in double ranom lengths with stringing done by railer trucks, frequently over seemngly impassable trails where tractors ere used to tow, or pull with a inch, to the top of a hill and then ere just as necessary for holding the railer as the truck made its way down he other side.

Cold wrinkle bending of the 24-in. dia. pipe was used throughout the ength of the line to curve it to the orizontal and vertical changes necesary for the ground traversed. Some abricated bends were used for known harp turns but in general pipe was ent as required to conform to conditions in the field. Two machines ere developed for this bending, both tilizing power applied by wire rope eeved through multiple blocks.

With the pipe clamped in a rigid-rame machine, power was applied on short lever arm to force a wrinkle end. Bends were limited to not loser than 15 in. and on welded pipe ere made so that a wrinkle did not ome on the longitudinal weld. In eneral such bends were made before he pipe section was connected to the ne.

Complete weld in 1½ min.

On four "spreads," operated by hree contractors on 320 miles of line Texas, instead of the usual arcelding, pressure welding of the pipe as used for the first time on a major cale. Pressure welding, or more echnically, "solid phase welding," is process developed by Linde Air roducts Co. for joining metals, in hich none of the material is melted r brought to the liquid phase at any time during the welding process.

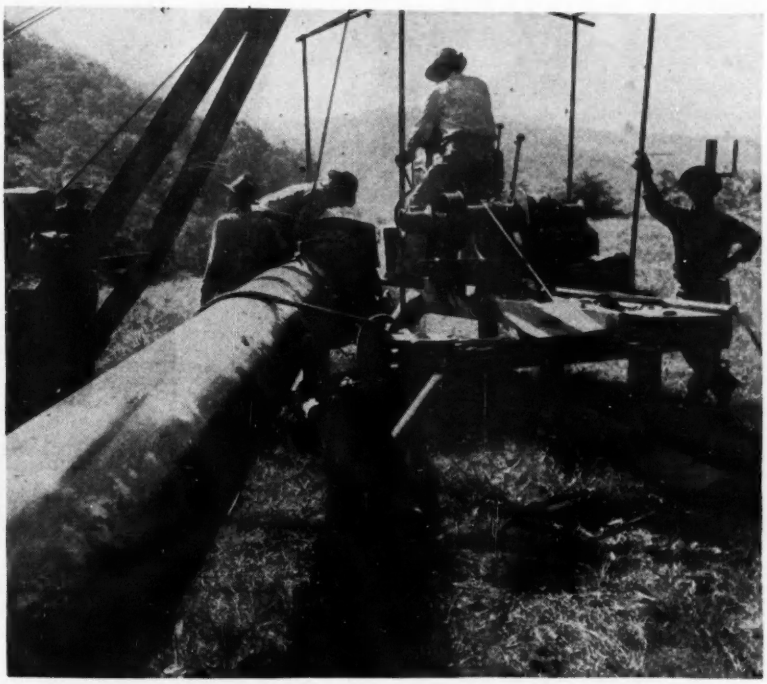


Fig. 2. Cold wrinkled bending of pipe was done by pressure applied by wire rope through several-part blocks.

In this method, the two faces to be welded are cleaned of oxides and other foreign matter and are butted together under pressure. The entire joint is simultaneously heated, to 1,050 to 1,200 deg. C., by a sufficient number of oxyacetylene flames to heat all of the area of the joint at one time. As the area attains the proper welding heat, the material becomes plastic and upsetting of the joint occurs under pressure applied by hydraulic rams. The heat, pressure and forging action produces a weld of superior quality in which the joint

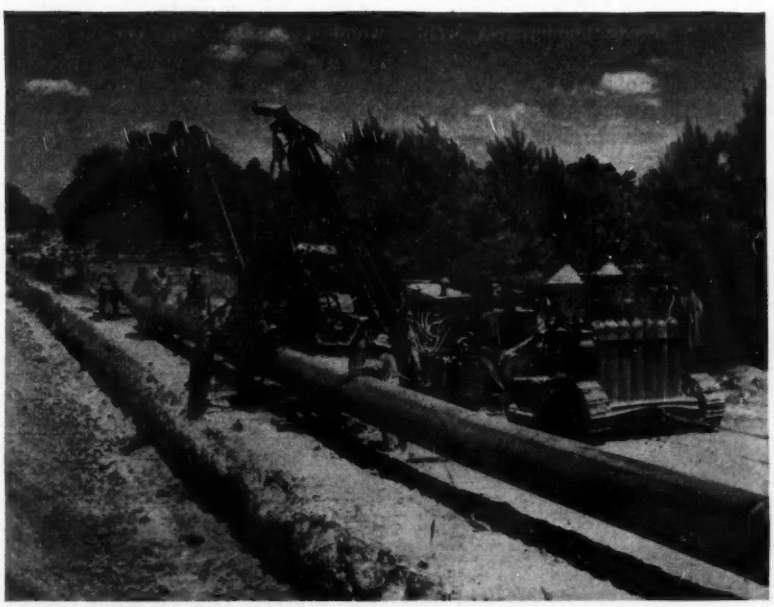


Fig. 3. Leading "boom-cat" lines up length of pipe as second tractor positions hydraulic controlled pressure welding machine over joint.

Fig. 4. The 365 oxyacetylene jets are "fired" in open position above the pipe to show how they operate. Right: Joint is instantaneously heated to 1,100 deg. C, as hydraulic rams push pipe together to make weld.

is said to be as strong and ductile as the base material and of identical chemical composition.

About 1½ min. is all that is required to make a complete weld on the 24-in. dia. line. Hence, welding is done in a shorter time, with far less equipment and some 25 less men per spread than is required for older methods of welding.

Pipe cleaning methods

Special care was used to clean the interior of each section of pipe of all foreign material before joining. A man on a garage-type creeper went through each length of pipe, pushing out all loose objects. Ends of the line were protected by covers whenever operations were shut down. However, this was not entirely adequate and a device similar to the "go-devil" used with a concrete pump to clean the pipeline was forced through the gas line to clean it before final connection was made into a completed line.

Type of coating

Only about 200 miles of the pipeline was laid without coating. The rest was covered with a primer, a coat of coal tar enamel and then was wrapped with asbestos felt. The pipe at river crossings has two layers of asbestos felt, protected by wired-on wood slats, while the section of the pipe under "river weights" has four layers of asbestos felt. The "river weights" are half-cylindrical weights of cast iron clamped on the pipe to offset its buoyancy when submerged.

At road, railroad and some river crossings the 24-in. pipe was put through a casing of 28-in. pipe to protect the pipe and to allow for movement or removal.

Aerial river crossings

Aerial crossings, with the pipe held by cables, were used to carry the line across the Colorado (in Texas), Brazos, Sabine, Red, Buffalo and Dix rivers. These were special type crossings with two overhead cables over high towers and two side or sway cables holding the line rigidly. Spans of these crossings varied from 560 to 1,280 ft. between towers.

Pictured in the accompanying illustrations is the 920-ft. main span Brazos River crossing, typical of the structures designed by Matthews and Kenan and built by Pittsburgh-Des Moines Steel Co. Two pairs of 2¾-in. dia. galvanized steel bridge cables supported on steel towers carry U-shaped brackets at 20-ft. centers to cradle the pipe. The two legs of the towers are 24 ft. center to center and extend 71 ft. above the pipe level at the tower while the cable sag at the center is about 57 ft. at 68 deg. F.

Cross-arm trusses, 135 ft. out to out, at about the pipe level support horizontally sagged 2⅛-in. dia. wind cables to take the sway out of the pipe. "Suspenders" from wind cables connect to the U-brackets.

Fig. 5. The 24-in. line divides into three 16-in. branches to cross major rivers. During much of the time construction was under way, the rivers crossed by the line were in flood. Wood slats were wired on to protect the pipe coating.

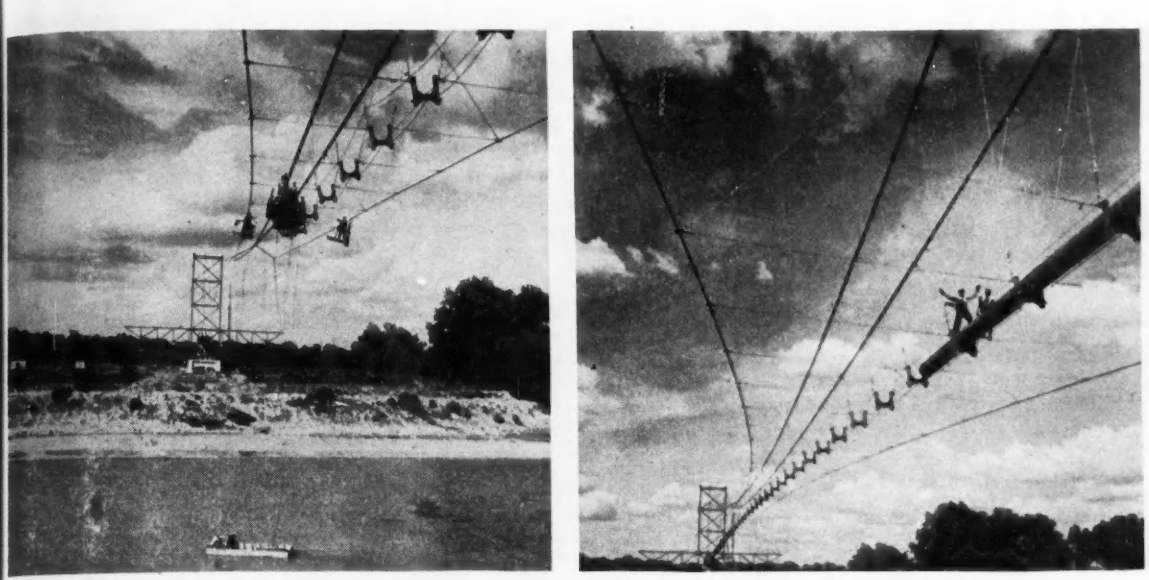


Fig. 6. Pipe cradles for 24-in. dia. line are suspended from two pairs of 2⅜-in. dia. overhead cables while sidesway is restrained by connection to horizontally sagged wind cables. Pipe is assembled and welded on temporary platform. Note that cradles are designed for possible addition of another line.

On all of the crossings cables are anchored into concrete blocks while concrete piers, frequently on piles, support the towers. The Red River crossing has a main span of 1,280 ft. with one loaded side-span 640 ft. long. On the other crossings the pipeline is brought to the ground near the tower and the cables landward from the towers are not used to support the pipe.

Sections of pipe were assembled and welded on temporary platforms on the land side of the main towers and the pipe pushed out across the river as additional lengths were added.

Mississippi River crossing

The pipeline crosses the Mississippi River on the existing Greenville, Miss. highway bridge. To keep the increase in dead load on the bridge symmetrical, and as low as practical, the pipeline is divided into two 18-in. branches, one carried along the outside of each truss on aluminum brackets and rollers.

All other stream crossings are submerged in the river bed, in many cases in trenches blasted in rock. For minor streams with no serious hazards a single line of pipe with the same outside diameter is used but with a wall thickness of ⅝ in., to provide extra strength across the stream. On navigable and hazardous rivers submerged multiple lines are used—three 16-in. OD ⅝-in. thick pipe being used in place of a 24-in. pipe and two 16-in. OD ⅝-in. pipe instead of a single 20-in. line.

Additional pump stations

Seven compressor stations, about 170 miles apart on the 1,265 mile line, force the gas northeastward at the rate of 200,000,000 cu. ft. per day. Each station has eight or nine 1,000-hp. compressors using about 12 cu. ft. of gas per hp. hr., or a total of 16,700,000 cu. ft. per day for the 58,000 hp. in all stations. Compressors operate at 750 psi. on the 24-in. line and at 912 psi. where delivering to the 25-in. section. Compressor station incoming or suction pressure is 400 psi.

Ultimately an additional pumping station, similar to those already built, will be installed between each of the operating stations making 14 in all with 118 compressor units having 118,000 hp. capacity. With this installation 262,000,000 cu. ft. per day of gas can be pumped, using 34,000,000 cu. ft. for power purposes, thus achieving a net operating gain of 20 percent for the cost of the compressor stations only.

WORK PERFORMED BY PRINCIPAL CONTRACTORS

Main Line Construction Length, Miles

Betchel-Dempsey-Price	324
Brown & Root, Inc	114
J. R. Horrigan Construction Co	92
Midwestern Engineers	72
Pipe Line Construction Corp	38
N. A. Saigh Co	128
Ray L. Smith Construction Co	53
Swinerton and Walberg	30
Williams Brothers Corp	404

Pressure Weld Co. (subcontracts for pressure welding on 320 miles of line)

River Crossings Above Ground

Austin Bridge Co.— Buffalo, Dix

Pittsburgh Des Moines Steel Co.— (Design by Matthews and Kenan) Colorado (in Texas), Brazos, Sabine, Red, Mississippi

Submerged Crossings of Major Rivers

Midwestern Engineers — Ouachita, Big Sandy, Kanawah

Williams Brothers Corp. — Nueces, Guadalupe, Trinity, Neches, Tennessee, Cumberland, Kentucky

Surveying and Mapping

Huey and Cage, Monroe, La.; Southern Mapping Co., Greensboro, N. C.; Tobin Aerial Survey Co., San Antonio, Texas.

Empty oil drums in rows 5 ft. apart support Marston steel mat while it is welded just before sinking.

Seaplane Ramp Made With Marston Mat

N. A. Bowers
Pacific Coast Editor, Engineering News-Record

A VERY SATISFACTORY seaplane ramp was made with Marston mat at Halavo in the Florida Islands where the steel was used in lieu of the concrete construction originally proposed. A concrete ramp would have required 2,500 sacks of cement, which was very scarce, and would have necessitated building a cofferdam or some form of protection that certainly would have involved much more than the few days in which the construction crew finished the ramp of steel mat. This installation has been used as an example of what may be done on work of this kind and in the following are included observations made, by the Seabee officers in charge, with a view to aiding in application of the same method elsewhere.

Of first importance is choice of a site where it is not necessary to make any extensive change in the natural slope of the beach. At Halavo the natural slope needed little changing except at the high tide line where the waves maintained a small ridge or abrupt change in slope. This had to be smoothed out to provide a uniform grade. As a result of this change each high tide leaves along this line a little ridge of sand, tending to rebuild the beach line as it was. This sand deposit is replaced by each recurring high tide, and, in order to maintain the ramp in usable condition, about two truckloads of sand must be shoveled off daily. At Halavo the daily disposal of this sand is not a great disadvantage because there is nearly always use for it in making concrete, in building walkways and in other maintenance and construction operations about the base. However, if this change in natural slope had been extensive the daily maintenance requirement likewise would probably have been heavy.

Site selections

Examination of typical ocean beaches in sheltered locations showed that the profile is likely to follow a parabolic curve. The ideal plan would be to find a site in which a minimum change in this natural curve would make possible the location of a ramp on a uniform grade. At Halavo the grade is about 10 percent with a slight cut, on a vertical curve, through the hightide ridge. The 10 percent grade is usually the established maximum because, while some of the seaplanes serviced can negotiate grades up to 12 percent, truck or tractor aid is required even on a 10 percent grade for bringing the larger ships ashore.

To build the Halavo ramp out to the desired depth of 6 ft. at low tide it was necessary to assemble a 90-ft. length of the steel mat. At the inshore end it was necessary to carry the steel only a few feet beyond the high tide line. Tidal range in this location is about 1.8 ft. The width of the steel ramp was made 50 ft.

The program for assembling the mat was to lay the sections transverse to the ramp centerline by methods ordinarily used in surfacing a runway. After fastening the sections with clips, the joints were spot welded at about 3-ft. intervals. Ends of the sections were also spot welded. Laying of the steel was started at the inshore end and when it had progressed to the water line about twenty empty oil drums were placed in the water in rows 5 ft. apart with the longitudinal axis of the drums parallel to the shore line. Over

the rows of oil drums 2x6 planks were then placed and wired to the drums to maintain correct spacing. This formed a platform which supported the mat and workmen, permitting welding of the steel while it was floated above the water. When the assembly of the steel had been completed to the outer end, the floating platform could be controlled with lines like a barge. Held in this way it was moved into exact position and the shore end was firmly anchored. The wires fastening the planks to the oil drums were then cut and a crew of men starting at the shore end walked seaward over the steel sheets, forcing the rows of released oil drums ahead of them. As the empty drums reached the outer end of the mat they popped out from under and the steel mat went down to final position on the bottom. The only additional work necessary to complete the ramp was placing a coconut log curbing along the longitudinal edges. These logs were extended from the inshore end to a distance 8 or 10 ft. seaward from the low tide line. They were fastened to the matting to anchor them down, but these fastenings did not have to be very strong as green coconut logs ordinarily have a specific gravity very little below 1.

Time for constructing such a ramp, it was believed, should be three to five days, using a foreman and a crew of twelve to fifteen men. The life of such a ramp could not be estimated on the basis of experience, but when inspected by an *ENR* editor about seven months after construction, it had required little or no maintenance other than the daily shoveling off of the accumulation of sand resultant from tide action at the shore line. The steel in the Halavo ramp was not painted after assembly, although it was pointed out that an extra coat of protective paint, particularly after the welding, would doubtless be very beneficial.

The Halavo ramp was built by the 34th U. S. Naval Construction Battalion, of which Comdr. J. P. MacBean, Jr. was officer in charge.

Joints in the mat were staggered and were welded at 3-ft. intervals.

Completed ramp closely follows natural slope of beach. Sand piled at left was shoveled off after high tide.

Mushroomed Buttress Heads Form Deck Of Mexican Irrigation Dam

Frederico Barona
Chief of Testing Laboratories,
Mexican Commission of Irrigation, San Jacinto, Mexico

***Contents in Brief**—Heads of 5-ft. thick buttress walls, mushroomed to a width of 29½ ft., replace usual flat-slab decks in 187-ft. high, concrete dam for the Mexican Commission of Irrigation. Calculations, checked by photoelastic tests, resulted in a design without stress concentrations or tensile stresses. This design, with the use of low-heat cement and a method of concreting the buttress walls to prevent cracking, eliminates steel reinforcement.*

LAS VIRGENES DAM, buttress type structure, whose novel design and construction with the use of low-heat cement made reinforcement of the concrete unnecessary, is now being built for the Mexican Commission of Irrigation. The dam is part of a new development of the Conchos River reclamation project in Chihuahua which will put under cultivation an additional 53,000 acres of excellent quality land.

Las Virgenes project consists of a main concrete structure spanning the deep gorge of the San Pedro River and of two rolled-earth dikes. Closure of the gorge by the dam will form a reservoir of 344,551 acre-ft. for which a spillway capacity of 211,887 cfs. is provided. In this article, only the concrete structure and particularly the buttress construction and use of low-heat cement are described.

The site of the dam is a gorge of sound, uniform rhyolite rock. Tests of 4x8-in. cylinders of this rock gave a compressive strength of 10,000 psi. and a modulus of elasticity of 5,000,000 psi. A solid, impervious ledge close to the surface made deep foundation excavation unnecessary; a cut-off wall only 13 ft. deep in rock was adequate.

Unusual mushroom shaped buttress

Abutment conditions were also favorable. The right side of the gorge, looking upstream, has a moderate slope, but the left side is a steep cliff as shown by the views, Fig. 2, and the contours in Fig. 1.

Between mass concrete abutments, a distance of about 560 ft., the dam is of buttress construction of which about 354 ft. is spillway section, with a slab extension of the deck over the buttress tops as an ogee crest. The buttresses are spaced 29½ ft. apart on centers and are 10 ft. thick at the base and 5 ft. thick at the top. Longitudinal struts brace the buttresses together.

The novelty of the structure is principally in the deck and buttresses. Instead of the usual arches of flat slab, the buttress walls have rounded or mushroomed upstream heads which form the deck.

Besides the spillway section of the dam, with a capacity of 106,000 cfs., there is a spillway channel of the same capacity at the left end of the dam, as indicated in Fig. 1. Water passing over the spillway of the dam will have a free fall of 131 ft. to the river bed. Momentum will carry this water beyond the downstream ends of the buttresses, and on the hard ledge rock no erosion is feared. The two spillways, having a combined capacity of 211,887 cfs., will take care

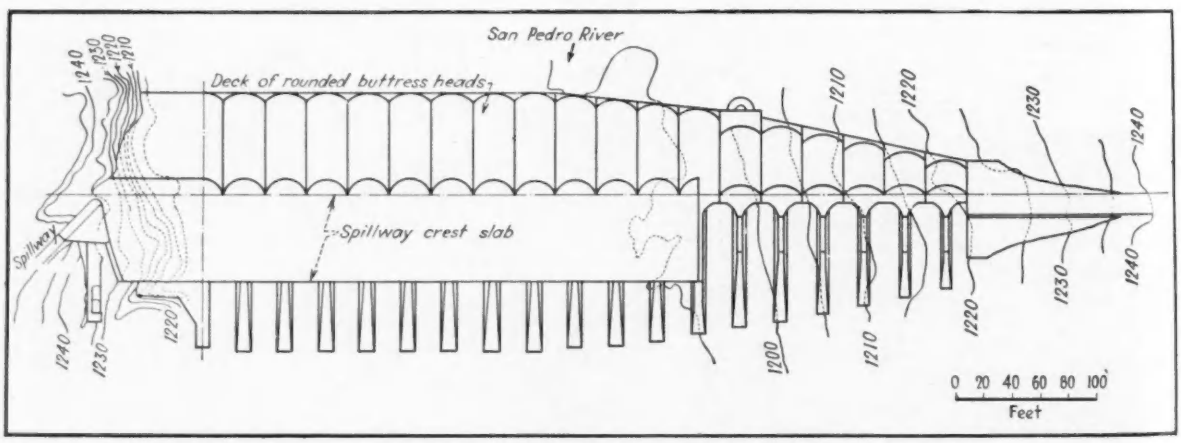


Fig. 1. Outline plan of Las Virgenes Dam; apparent arches are rounded tops of the mushroomed buttress walls. Contour elevations are in meters. Each spillway has same capacity.

of any expected flood of the San Pedro River.

Although the main purpose of the dam is to provide water for irrigation, some power will also be developed by two units totaling 6,000 kw. in a powerhouse at the right of the dam.

Buttress design

Novelty of structure is, as stated, in the buttress design; namely, the widening of the upstream wall tops to form the decks of the dam and division of the buttress walls into sections by vertical open joints which are to be concreted after poured concrete is stabilized.

General details are shown in Fig. 3. The chords of the rounded heads span 29½ ft. and the heads in succession form a continuous deck, which, viewed from upstream, has the appearance of a series of arches. The open joints in the vertical walls of the buttress are sizeable gaps of 4½ ft., with edges serrated to follow the direction of principal stresses and to provide a mechanical bond when the joints are concreted.

Buttresses with splayed, rounded heads have for some time been a subject of research in Mexico, to develop a design that eliminates reinforcement by confining concrete stresses to compression. The first use of the design was in the Don Martin Dam built at Coahuila in 1929. An improved and more economical design has been worked out for Las Virgenes Dam by analytical computations of stresses for several spans of heads and checking by tests of photoelastic models, with the purpose of determining the shape of head that, with the least volume of concrete, would prevent dangerous concentration of stresses and assure that no tensile stresses would be developed. In Fig. 4 is shown the device for making the photoelectric tests and also the stress distribution in the section finally adopted, as obtained by the tests. It is important to note that the black line in Fig. 4 left and the white dash line in Fig. 4 right show the limits of the test model, the material above serving merely to transmit load to the model.

Resistance to sliding (required buttress thickness) was computed by means of.

$$SF = \frac{f\Sigma V + A\,S}{\Sigma H},$$

where SF is the shear friction factor, ΣV the sum of the vertical forces acting on a section, f the coefficient of internal friction of concrete ($f = 0.65$), A the area of the section, S the allowable unit stress ($S = 400$ psi.) and ΣH the sum of the horizontal forces.

In Las Virgenes Dam, when full to the crest, the shear friction factor has a value of 4.81 which is safe, since 4.5 is the minimum required as a safety factor.

Earthquake stresses were computed on the assumption of an earthquake acceleration equal to one-tenth the acceleration due to gravity. To take the lateral thrust, the buttress walls are braced by 24x40-in., horizontal, concrete struts, Fig. 3, which carry the load to the rock abutments. When under full assumed earthquake stress, the struts will undergo compression of 1,140 psi., which is safe for 5,000-lb. concrete. Buttress stresses, including earthquake load and water load to the crest of the dam are as follows:

	Downstream	Upstream
Compression, psi.	287	71
Shear, psi.	143	66

With 5,000-lb. concrete these stresses also are safe.

Each buttress is statically independent; relative movement between buttresses is possible. Where the widened heads come together to form the deck are joints filled with asphaltic felt and spanned by sheet-copper water stops, as shown in Fig. 5. It is expected that these joints, with the counteracting strength of the massive concrete heads, will take care of any expansion and contraction movements in the deck and the buttress tops. Shrinkage cracks in the buttress

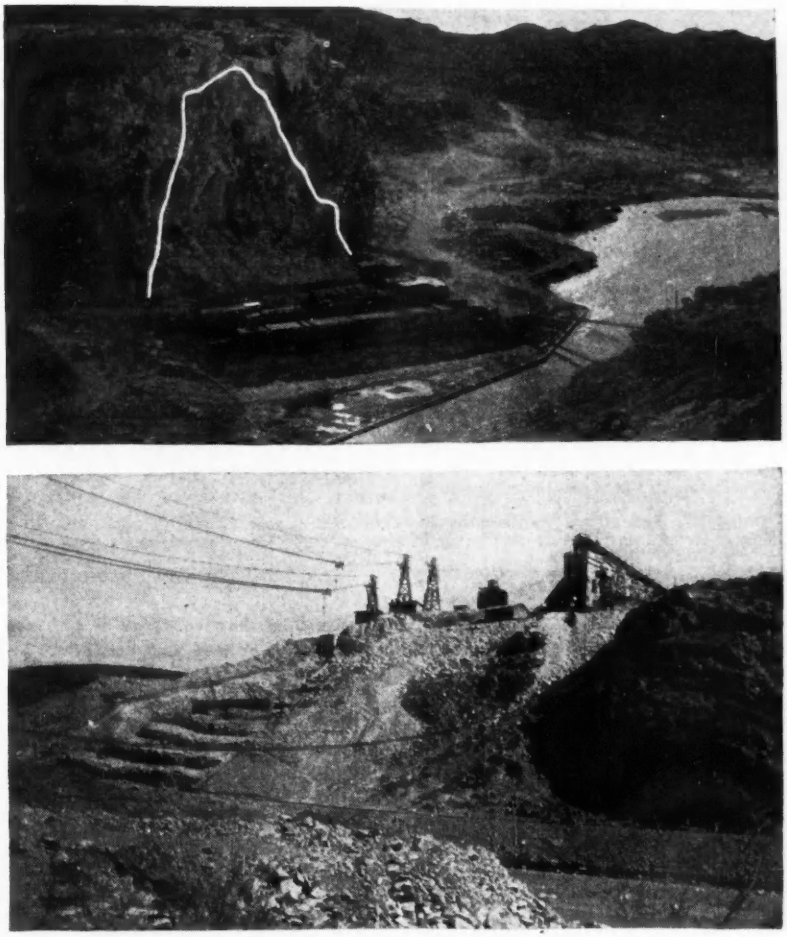


Fig. 2. Banks of San Pedro River gorge (top) looking upstream at the site of Las Virgenes Dam. White line outlines buttress shape on steep cliff. At the base of the cliff is the diversion channel; also buttresses are under construction. Concrete plant and cableway towers on right bank, (are shown in illustration at bottom) high above excavation for buttress footings.

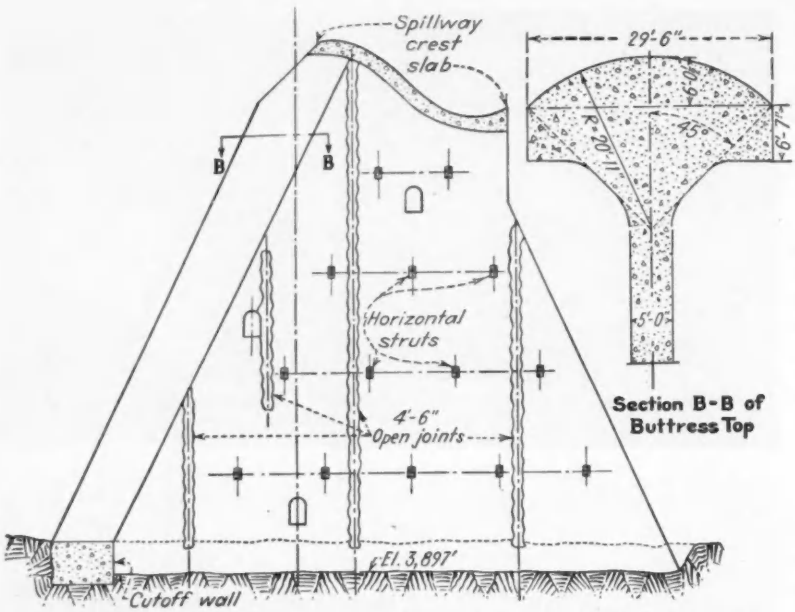


Fig. 3. Section through spillway of Las Virgenes Dam showing detail of buttress head, buttress wall and ogee crest to arch waterfall beyond wall ends.

walls are guarded against by using low-heat cement and by temporarily leaving open joints which permit the separated sections of wall to contract.

Concrete mixing and placing

Designed especially to reduce cracking, the concrete mix has a compressive strength of 5,700 psi., when using only 0.99 bbl. of cement per cu.yd., and the cement used produces a low-heat concrete. Having a total silicates content of approximately 76 percent, the cement contains little tricalcium aluminate and tetracalcium aluminum ferrite— about 3 percent and 13 percent, respectively. The alkali content is also low, a total of only 0.53 percent. More difficult grinding raises the cost of this cement, but the smaller possibility of cracks occurring is believed to justify the greater cost.

Gravel banks along the river below the dam are worked for aggregates. The material obtained is mostly rhyolite, rounded in shape and of good density and strength. It is washed and screened to provide these sizes: Sand up to $\frac{3}{16}$ in., small gravel up to $\frac{3}{4}$ in.; gravel $1\frac{1}{2}$ in., large gravel up to 3 in., and cobble up to 6 in. The proportions of the mix are varied to secure the greatest workability and a minimum cement consumption, with a fixed water-cement ratio of 0.6. The basic mix, in general, is 1:2.4:6.4. Tests of the concrete to detect any expansion due to alkali reaction showed no dimensional changes.

Three cableways

The concreting methods include special procedure in filling the open joints in the buttress walls, Fig. 3, and in bonding the construction joints between successive lifts of the buttress heads, but otherwise follows common practice.

A mixing plant with two 2-cu. yd. mixers was set up on the right bank of the gorge. After being carried to the forms in bottom-dump buckets, traveling over cables supported on fixed towers, the concrete is consolidated by vibrators. Three cableways are required to cover the length of the buttress footings, which at the river bed are 190 ft. long. The cableways are of 15, 12 and 6-ton capacity.

Two of the buttresses under construction are shown in Fig. 6. The

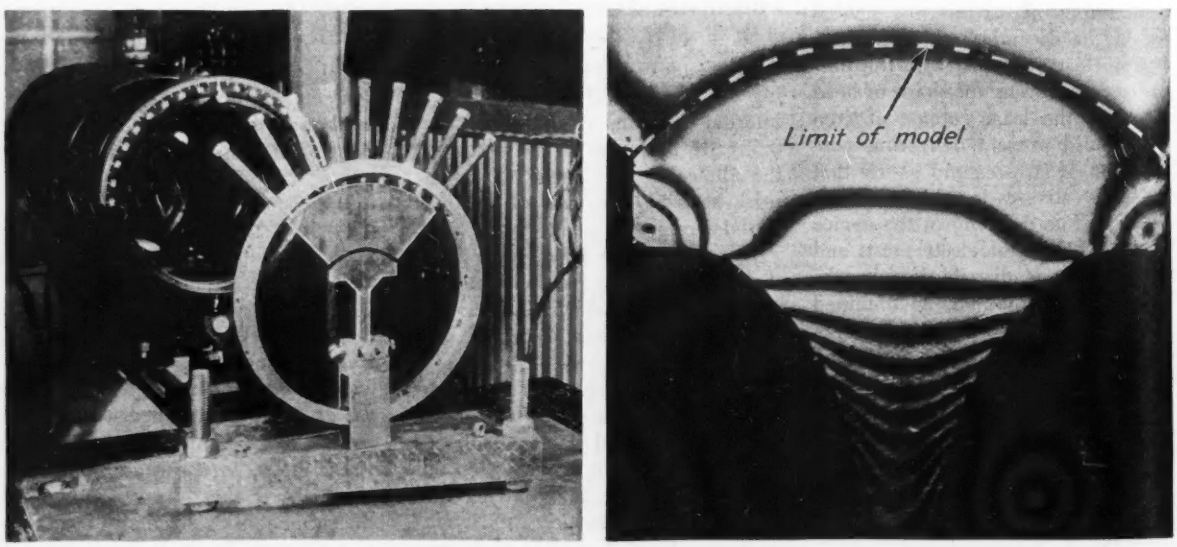


Fig. 4. Photoelastic equipment was used to check analytical computations of stresses in rounded buttress heads; black line is upper limit of model proper. Right: Stress distribution in model of adopted buttress head, as determined by photoelastic test. White dash line delineates boundary of model.

one at the right is up four lifts, or 20 ft. All blocks are concreted in 5-ft. lifts and no block in a buttress is carried up more than 5 ft. until all the blocks in that buttress have been concreted to the same height. In the upstream blocks the wall and rounded head are concreted in the same operation. The concreting of the openings in the walls, Fig. 3, is a separate operation.

Perfect bond at joints

Since there is in each buttress head, and therefore in the deck of the dam, a horizontal construction joint at every lift, careful attention is devoted to making these joints strong and impervious. This requires perfect bonding at each lift. In placing new concrete on old, the bonding surface of the old concrete is thoroughly roughened with pneumatic tools and cleaned to expose the aggregate. Then, with the fresh concrete vibrated to close contact, experience shows that the joint is as strong and water tight as the original buttress or concrete used elsewhere.

Before concreting the open joints in the buttress walls, it is required that the concrete in the adjacent blocks (1) be at least two months old; (2) be in a dry condition, its curing having been discontinued at least three weeks and no rains having occurred during these three weeks, and (3) its temperature and the outside temperature be not higher than 53 deg. F. With these requirements fulfilled, the joints are concreted as desired, but for construction reasons, generally when the wall blocks have been carried up from five to ten lifts.

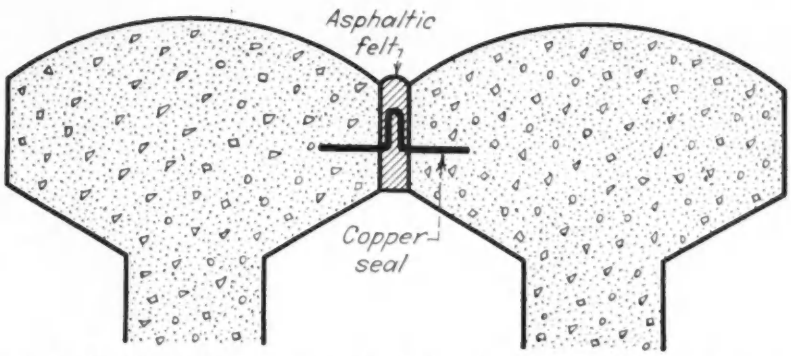


Fig. 5. Deck joints between contacting buttress heads permit independent movement and provide perfect water seal. (Sketch is not to scale.)

Provisions for diversion

At the present time the larger earth dike and all the excavation are completed and about 25 percent of the concrete is in place. Two bays of the dam are being left open for stream diversion until the drought season, when a 35-ft. earth cofferdam will be used to hold back the water while the concrete is placed. Completion of the dam by 1946 is expected. All work is being done by force account by the Mexican Commission of Irrigation.

The Minister of Agriculture, Marte R. Gomez, is the president of the Mexican Commission of Irrigation, Adolfo Orive Alba is executive commissioner and Eugenio Riquelme is secretary commissioner. Antonio Coria is director of engineering, Andrew Weiss is consulting engineer, and Aurelio Benassini is director of studies and design.

Design of the structure was made under the direction of Oscar Vega Arguelles. Photoelastic studies were carried out under the direction of Fernando Hiriat Balderrama. The project manager at Las Virgenes Dam is Enrique Rubio. The author is in charge of the materials of construction department of the commission. There is a central testing laboratory situated at Mexico City and field laboratories at all projects under construction.

Fig. 6. Buttresses under construction; the one at the right has been carried up four lifts, or about 20 ft.

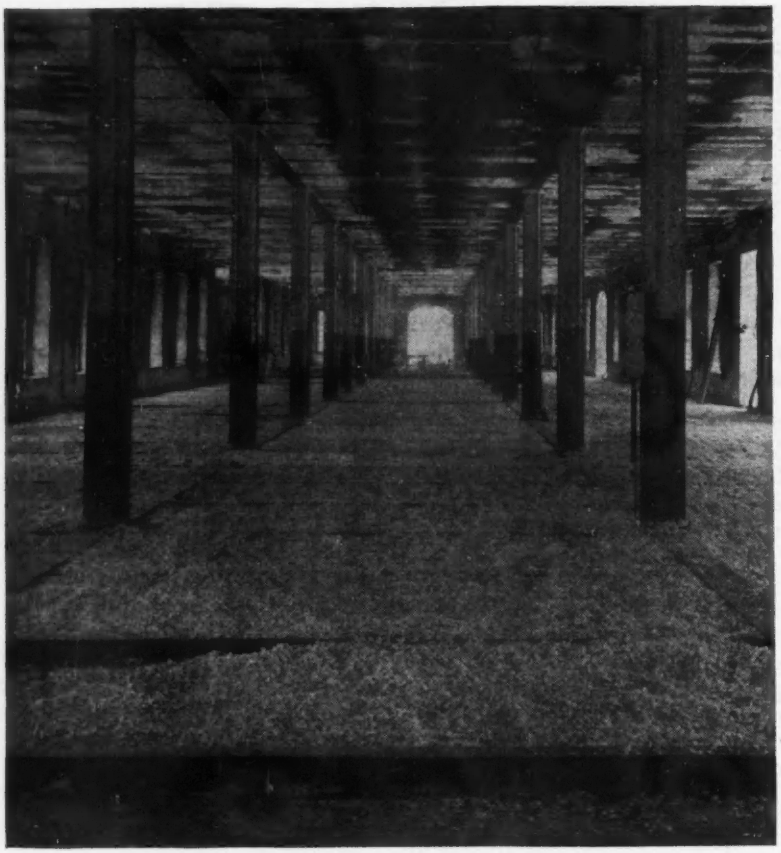


Fig. 1. After removal of the old timber floor, the non-reinforced brick arches were covered with a minimum of 3 in. of moistened sawdust and shavings compacted in place with hand tampers.

Sawdust Fill Used Under Concrete Floor

USE OF SAWDUST AND SHAVINGS as fill below a new concrete floor solved a major problem in reconstructing an existing warehouse at Rock Island, Ill. arsenal for use as a cafeteria. A considerable cost saving also resulted.

Built in 1867, the two-story with basement building has 27-in. thick outer walls of hand-cut limestone. The wrought iron interior framing consists of built-up round columns on about 20-ft. centers each way, longitudinal girders made up of double 15-in. I-beams, and 12-in. transverse floor beams on about a 5-ft. spacing. Non-reinforced brick arches of single brick thickness frame between the beams, being supported on the lower flange of these members. Original finished floor consisted of 1½-in. planking over 2 x 6-in. longitudinal nailers.

The new use for the building made necessary replacement of the timber planking of the first floor with a reinforced-concrete slab designed for a live load of 125 lb. per sq. ft. Use of such a floor dictated that a lightweight fill be used above the arches to the level of the upper flange of the girders. Otherwise the concrete would be much thicker than necessary, the weight of the concrete excessive, and the new construction more costly; by use of such a fill, a slab of 4-in. minimum thickness would be adequate.

Fill materials considered

Materials considered as a possible fill included natural earth, slag, sand, and a combination of sawdust and shavings obtained from the central carpenter shop of the arsenal. The latter was chosen because of its light weight, plus the fact that it was available in sufficient quantity at no cost other than that of transporting the material the short distance to the job.

Work required to strengthen the existing wrought iron floor members included addition of a ¼ x 12-in. steel cover plate on the top flange of the double girders, the plate being secured in place by a ¼-in. fillet weld along each edge. This operation, which created no special problems in joining the steel and wrought iron, cost 23 c. per lin. ft. of weld. In order to prevent deflection of the wrought iron beams a 4 x 4-in. post was installed in the basement under the middle point of each of these members supporting the floor.

Sawdust compacted in place

After the sawdust had been soaked with water for several hours, it was delivered to the desired point in the building by wheelbarrow. The material was compacted in place with wooden hand tampers, being crowned about 1½ in. above the top flange of the beams. The sawdust was then covered with a single thickness of bitumen-impregnated paper.

The concrete mix used in constructing the floor, based on a cubic-yard, was as follows: 1,990 lb. of gravel, 1,234 lb. of sand, 100 lb. of fines (blow sand), 517 lb. of ordinary portland cement and 28 gal. of water. This mix, which had a slump of 2 to 2½ in., had a strength of about 3,600 psi. at 14 days. The concrete was delivered as a ready mix, distributed by rubber-tired buggies, and vibrated in place, the concrete being placed simultaneously over two arches for the full 60-ft. width of the building. Although addition of the concrete caused some immediate compaction of the sawdust and shavings, which had a minimum thickness of about 3 in., no cracks developed in the finished floor. During the first seven days after being placed the concrete was kept covered with moistened burlap bags.

Repair of the ceiling (Fig. 2), which was also of arch construction, consisted of plastering with a lime

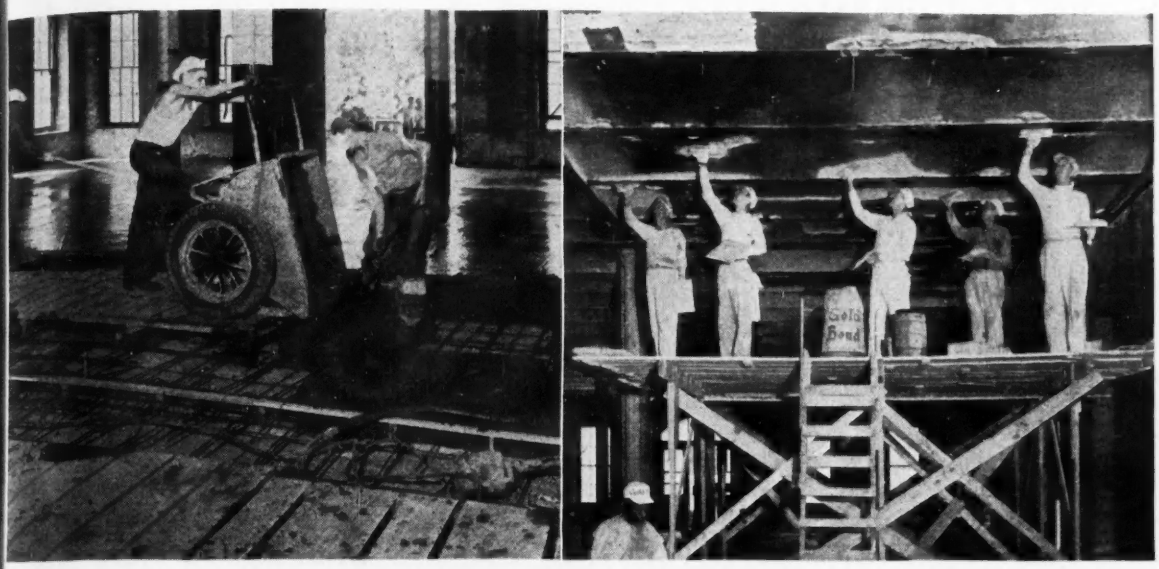


Fig. 2. Concrete for the finished floor, which was separated from the sawdust fill over arches by a single thickness of bitumen-impregnated paper, was delivered by rubber-tired buggies and vibrated in place. Right: Repair of the arched ceiling consisted of plastering the scaled areas with a lime mortar.

mortar the areas where scaling had occurred. As a last operation, the ceiling was given two coats of resin-emulsion paint.

The work was done by the Rock Island district, U. S. Army Engineers, Lt. Col. John H. Peil, district engineer, Maj. Frank Ashton, head of the construction division, Arnold W. Philipp, head of the design section, and G. L. Miller, resident engineer. Lovering Construction Co., Burlington, Ia., and St. Paul, Minn., with E. Karlson, superintendent, was the general contractor.

Army Engineers Package and Ship Hospitals to Southwest Pacific

Prefabricated housing, furnished by the Supply Division, Office of the Chief of Engineers in packaged form, is supplying hospital space for a large portion of the American wounded in Southwest Pacific operations. Originally designed as barracks, these units lend themselves perfectly to hospital purposes, each barracks becoming a ward.

With bulldozers and other heavy engineer equipment to clear the site, a new hospital is only a question of days. The barracks are so packaged and arranged that they can be erected by regular engineer troops or unskilled labor. Because they are separate units, the pattern of a hospital can be arranged to fit the site or may be made any size necessary.

The standard designs, as developed by the Engineer Board at Fort Belvoir, are grouped in three classes: metal, precut and wood. There are two types of each design—tropical and insulated. The tropical design embodies such features as continuous windows, ventilators at the base of the sidewalls, and eave overhang to carry off tropical rains. The insulated type, for colder climates, has a minimum of windows, gable or ridge ventilators and an interior lining of insulation.

Basic designs specified a building 20 by 48 ft., to be extended, if necessary, to any length up to 120 ft. This was accomplished by packaging separately, complete parts of a building to form an 8 by 20-ft. unit that could be inserted between the ends of basic buildings. These separate units, when required, also contain windows for both sides of the building or doors, when an exit is necessary. By this means, it was more easily possible to plan hospitals of any size.

Packaged hospitals are a natural outgrowth of the speed with which the present war is being conducted. When the United States was drawn into the conflict and troops were sent to all parts of the world, the need for housing became the job of the engineers. The units had to be a type that could be quickly assembled when time was the primary consideration. Many designs of such shelters were already on the market and the engineers bought them. Nissen huts were bought from the British for the troops in Iceland, and wood, plywood and metal buildings of square, pyramidical or semicircular shapes were bought in nearly every state in the U. S. and shipped immediately.

But a standard design was necessary. The engineers experimented with several styles but only the type with straight sidewalls was acceptable to the Surgeon General for hospital purposes. This led to the design of the present standard types which are adaptable for barracks or hospitals as the need may arise.

The bulk of all shipments today are for hospital purposes. There is limited shipping space allotted to the engineers and it must be used for the most vital needs. This results in housing necessary only for hospitals being shipped.

This Business of City Engineering

P. L. Brockway
Director of Public Service and former City Engineer,
Wichita, Kansas

***Editor's Note**—From his background of 27 years' experience in the administration of municipal engineering affairs at Wichita, Mr. Brockway is qualified to take a broad view of the role of the engineer in public service. He defines the engineer's responsibilities as comprising more than the possession of technical "know-how." Equally important, he points out, is the establishment of harmonious relations with the public, a sympathetic attitude toward contractors, and an appreciative understanding of legal and administrative questions that arise in all municipal work.*

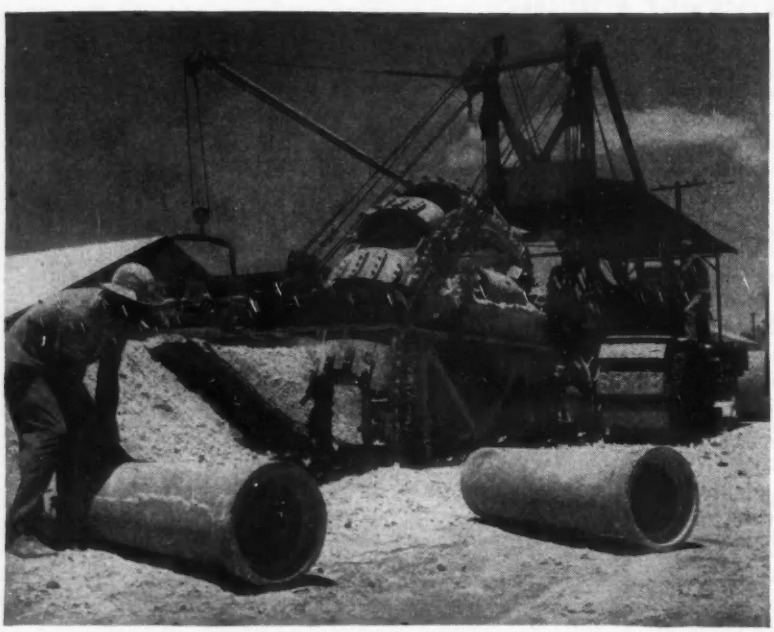
MUNICIPAL ENGINEERING practice calls for knowing at least a little about a lot of things. Obviously, the engineer in public service, as in other fields, should possess as much technical knowledge as he can acquire. But this alone is not enough for success in city engineering. Of equal, if not greater, importance is the engineer's concept and practice of public relations as exhibited in his contact with taxpayers and with contractors, coupled with an understanding of the legal responsibilities of a public servant. All of these matters are interrelated and form part of the challenging job of city engineering.

As an administrative officer, for example, the engineer must deal with the varied interests of the people who live and work in his community and to whom he represents an authoritative guide on technical matters. He is under an obligation, therefore, to give a sympathetic ear to those who concern themselves with matters relating to physical improvements of the community. And a public improvement affects the pocketbook and interest of virtually every citizen.

Probably the most difficult individual with whom he must contend is the one who has made an outstanding success in his own business and has unconsciously absorbed the idea that his judgment is infallible. It is often necessary to gain the support of such a person, gradually advancing ideas in an indirect way, so that he adopts them as his own. If, as often happens, he openly takes credit for an improvement when the project is successfully concluded, the engineer should be among the first to offer congratulations.

Then there is an occasional irate and abusive citizen, each of whom is in a class by himself. In dealing with this type of person one thing is essential—the engineer must not lose his own temper. Patience and the development of a "thick skin" are prerequisites in coping with situations of this kind. An unbiased explanation is due even to the most unreasonable citizen who sooner or later will make so absurd a statement that he can be picked up on it and will lose face. A common argument in such cases is the accusation that the engineer is actuated by personal motives. In such cases the less said the better.

There are in every community a few public pests—sour-minded folks so mentally and temperamentally constituted that they cannot conceive of anyone actuated by other than selfish motives. You cannot deal with such individuals, but you might ease your mind with the rationalization that these people are useful in the body politic since they do help to check unwitting carelessness of the engineer.



FWA photo

Fig. 1. Actual construction of an improvement project is generally the responsibility of a contractor. This means that closest cooperation between the engineer and the contractor is necessary if the city is to get the best possible job and the contractor is to receive a fair return for his effort.

g. 2. Municipal improvements like this street job affect many taxpayers and are seen by all. Thus, the city engineer's ncept and practice of good public relations becomes one of his foremost challenges.

Taken as a whole, the engineer's at-ude should be to give all-comers a r and complete explanation of any d all matters in which they are in-rested. In so doing he may have to quire an enemy. In fact, if he does t have a few enemies in the course years it could be assumed that he ks character. Actually, there are casions when he should be able to int with pride to some of his en-ies.

Group contacts desirable

The municipal engineer cannot end all his working hours dealing h one person at a time and there occasions when an expression of views should be directed to the mmunity at large. Thus, while it is t advisable for him to be constantly oted in the public press as if he re a candidate for office, he should sufficiently informed and interested give interviews on the work and ns of his department. If at all pos-le, the friendship of the newspa-rs should be cultivated as they are primary contact between the work the engineer's office and the citi-ry.

Desirable types of publicity include preparation of articles for the hnical press, and talks to various ganizations about the public busi-ss in which these groups might be erested.

So far, this discussion has con-ned itself almost exclusively with the engineer's contact with the public in the preliminary or educational stages of public improvement projects. There remains the construction period, and after that the operation period in which his judgment is automatically vindicated or condemned.

It is most important that the construction stages of any project be so planned as to minimize inconvenience to the public. Fortunately, however, people soon forget the inconvenience in the greater pleasure of using the improvement.

The operation period is the longest and its success or failure is the most important, both to the engineer and to the public he serves. The best possible service should be kept in mind by the engineers when plans are being considered and during construction, since it is just as imperative to him as to any business on earth that he have satisfied customers. In fact, if there is a clash between sound economics and perfect satisfaction to the public in service rendered, economics should be sacrificed to some extent. It should be borne in mind, however, that even though the public does not understand details of plans and specifications, they should be developed with the thought always in mind that the engineer is reaching down into the public pocketbook and spending the other fellow's money, sometimes against his wish. The return for money spent should, therefore, be the most satisfactory possible, since the taxpayers have practically none of the fun of spending it.

Successful completion and operation of an improvement for which an engineer has worked and planned for years is, in some respects, the greatest reward that can come to him. People may not generally know it, but the engineer regards these improvements as his monuments whether or not his name is on them.

Contractors usually reliable

In most cases actual construction of an improvement project is the responsibility of a contractor. Therefore the engineer's relation with contractors becomes a matter of concern.

In the past the old rule, "Let the buyer beware;" seemed to be the ruling motive in public contract work, and performance of the contract developed into a battle of wits between the city engineer and the contractor. However, municipal construction contracting is big business, employing big business methods and operated by broad-gaged wide-awake men. In dealing with a contractor it should be assumed that he intends to comply with the spirit of the specifications until it is discovered otherwise.

The attitude of the engineer concerning methods of construction should be that it is largely the contractor's own affair, provided the desired end is gained in a reasonable length of time. Modifications of plans, of course, must be critically ex-

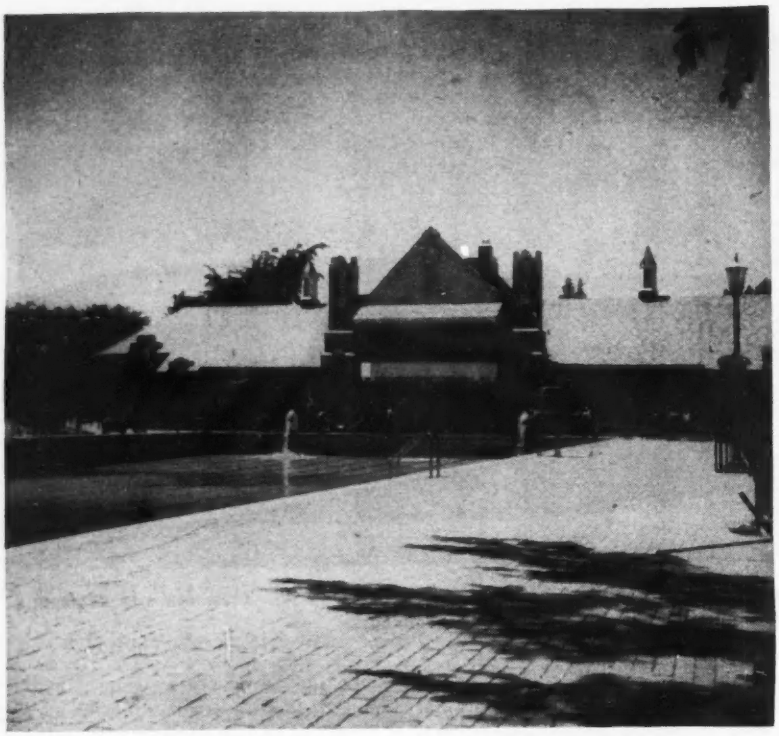


Fig. 3. The city engineer regards an improvement like this municipal pool as his monument whether or not his name is on it.

amined before being allowed. Details of execution that simplify and expedite construction should be permitted and it can be expected that a fair-minded contractor will, in turn, suggest detail changes that will improve the job.

Concerning extra payments, the engineer cannot be liberal but he should always be reasonable. In this respect a reputation for fair play is worth more to the engineer in obtaining work done as he wants it, and to his client for getting the best possible contract price, than the most binding and explicit set of specifications ever devised. The engineer might be surprised if he knew how soon his reputation for fair play, or for any other outstanding characteristic, becomes common knowledge among contractors who are possible bidders. And a contractor instinctively suspects the good faith of an engineer who prepares such slovenly plans and specifications that the meaning is doubtful or clouded.

Specifications only guides

There probably never was a construction job on which the desirability of changes in detail did not become apparent as the work progressed, and for this reason specifications should be written to provide for changes. In writing specifications, it is important to use plain language and short sentences and to eliminate ambiguity; the specifications of engineers who have grown old in the game show the desirable characteristics of brevity and conciseness. Specifications should be, however, only guides to the engineer and must be tempered with common sense and good judgment.

The engineer is in a dual position. He is the middleman between the client and the contractor, owing first allegiance to the employer, yet equally responsible to the contractor after good service has been rendered. He is also a co-constructor with the contractor, each rendering his own particular kind of service in gaining the results desired by the common employer of both. Considered from this standpoint, it is readily understood wherein sympathetic consideration of the contractor's problem will bring best returns for the expenditure of the owner to both engineer and builder.

So far, consideration has only been given to those contractors who are responsible, who prefer to work under the assumption that they are expected to render intelligent and efficient service and that, having discharged their obligation in this respect, their compensation is assured without any other factors entering into the situation than the usual possible delays incident to financing the work.

Contractors are human too

Unfortunately, there are a few contractors who have the same human failings as a minority of folks in other occupations. Just as responsible contractors prefer to pass up work handled by inexperienced or over-exacting engineers, so do engineers prefer to eliminate the inexperienced or unprincipled contractors. While this can be done on work handled for private corporations, where bids are submitted by invitation, no one with experience and who can give bonds can be barred from competition in municipal work. It is, therefore, a hardy engineer who will recommend that the work be awarded to any except the lowest bidder.

If the work is finally awarded to one of the undesirable class of contractors, there is only one course for the engineer to take: redouble his vigilance, add extra inspectors, and require the essential parts of the work to be as true to plans and specifications as is humanly possible. Also, if help be needed in handling the refractory or incompetent contractor, there is in every specification the long legal paragraph specifically designed for this contingency.

Law is guidepost

This is only one instance of the many contacts the engineer will have with legal matters, for as a public servant almost every move he makes is governed by law. In fact, the rights of the citizen taxpayer are so well protected that it sometimes requires court decisions to define the law.

It is a matter of credit to the legal profession, however, that a competent attorney would much prefer to advise his client how to keep out of trouble than to help pull him out. Cities have legal staffs of one or more persons to perform this function, and the city engineer must work closely with the attorney in advising the policy-making and legislative body regarding public works.

The city engineer also will have tact with legal matters through nage claims. If the claim arises n anything for which the city en- eer has official responsibility, he uld confer with the attorney who advise as to facts to obtain at the tion on which the claim is based. he claim reaches court, the engi- r may be called as a witness. In case it will help him to keep his posure if he knows something of general rules of evidence. He is at all responsible for court pro- ure, but it is indeed bewildering he uninitiated. The principal thing emember is the oath to speak "the h, the whole truth and nothing but truth." The city attorney will not call a witness when he knows the evidence will be damaging.

In short, while the city engineer must learn the broad aspects of the law governing almost every official act, he must not presume to think he can dispense with legal advice.

Engineer also is administrator

In his contacts with citizens, contractors and the law, the city engineer is as much an administrator as an engineer. This discussion so far has considered all these functions as related to the individual but it is evident that no one, for instance, can perform all the necessary routine duties in any city except the smaller ones. We should consider, then, the situation in which the city engineer has developed considerable responsibility in a public works department.

In this case he will require an organization of which he is the recognized leader, with final responsibility and, therefore, with final authority. Certainly his engineering training should assist him in making logical and orderly functional divisions of responsibilities.

Given the administrative ability, the training and experience and the background, the engineer administrator should deal with his subordinates in the same way that he meets his superior, the citizens—as human beings, never completely right, but never entirely wrong.

Allied Commission Supervises Repair Of 4,000 Miles of Road in Italy

econstruction of highway commu- ations in Italy has been carried on he face of the most extreme diffi- ies according to a release from dquarters Allied Commission, ed Feb., 1945. War's inevitable truction left in its wake too little erials for reconstruction and too e transport to move the materials, kers and supervisory personnel. ertheless, the Allied Commission orts that in 1944, 736 bridges were ilt or repaired in liberated Italy more than 4,000 miles of road e put back into serviceable condi- and maintained.

ost of the road and bridge con- ction program was slightly more \$21,000,000. The projects were er the supervision of the Public ks and Utility Sub-Commission e Allied Commission, which made report.

January of this year, work was ted on seven bridges of military rity and on 126 of other than mil- y significance, some of which will onstructed entirely under the su- ision of an Italian agency. Cost be about \$2,250,000.

y the end of January, 180 bridges ilitary classification were in proc- of reconstruction, as were also 273 non-military priority. The total oad mileage has been increased l it is now some 4,700 miles. mprovements of Allied-Italian working arrangements made it practicable in November, 1944, to turn over to the Italian government the power to approve and carry out all civil projects within its territory, irrespective of cost.

In March, 1944, the sub-commission requested some 4,000 tons of heavy engineering plants and equipment, together with some transport, from the United States. This material began to arrive early this year. However, the vehicles constantly being used in road and bridge construction are wearing out so fast that no great net improvement in transport facilities will actually be experienced.

The allied army provided some special materials, such as bitumen, steel and occasionally cement and timber, and equipment such as concrete mixers, road rollers, and tar sprayers. But the undertaking mostly required the ingenuity of the sub-commission engineering staff and of the Italians. Supply of cement, bricks, and bitumen are becoming available as quarries and factories are reactivated, but still materials are scarcely sufficient to fill the needs for military roads.

Another responsibility of the Public Works and Utility Sub-Commission is the restoration, if possible, of water works. Damage to these systems was, in general, severe, since it was a fairly simple matter to destroy reservoirs and aqueducts, pumping stations, purification plants and distribution mains. A fairly adequate supply was restored, however in places like Palermo, in Sicily, and Naples within a few weeks of their liberation, and similarly in scores of small towns. Damage to the Rome system was severe but was completely repaired within five months. In the provinces immediately south of Rome, the water systems of between 15 and 20 towns were completely wrecked.

Damage to sewage systems, fortunately, was moderate, and in most instances repairs were made without much difficulty. This was primarily because most towns in Italy are not on level sites and so were not dependent on pumping stations, which almost inevitably were destroyed. The situation is different in liberated north Italy, however, because several of the larger cities are on plains and require many pumping stations for sewage disposal.

While the usual range of difficulties faced restoration of gas works, a further complicating factor has been the procurement of supplies. Neither Italian lignite, nor Sardinian coal is effective for gas production; gas coal must all be imported from the United Kingdom or elsewhere. For the most part, the only gas works in Italy are in the larger cities. In places such as Messina and Catania, both in Sicily, and in Naples, damage was heavy. Just recently the situation in Naples has been much improved, although certain zones in that city are still without gas supply. In Rome and Cagliari the gas works were not damaged.

New competition for traditional methods of earth handling in India.

Cross-Country Trek in India

Lieut. William C. Carter
Construction Service, Services of Supply, U. S. Army, China-Burma-India

***Editor's Note**—This story of driving American construction machines 300 miles across India cannot be classed as essential reading but it is a typical and interesting account of what engineer troops have to do on some of our far away war fronts.*

ONE HOT APRIL AFTERNOON the Chief of Operations of the Superfortress Fields in India called me in and handed me a nice assignment. First he asked what I knew about Tournapulls. I reported that my complete experience represented four hours of G.I. instruction back in Idaho one morning last summer.

Then came the assignment. Somebody was in a hurry to move dirt, and the big machines, with 12-cu.yd. scrapers, were in the Theater heavy equipment yard and the only way to get them to the job was to drive them several hundred miles. Our trailers were being used elsewhere and a low underpass prevented shipment by rail. I was to take three operators and a mechanic, pick up three more operators from another battalion and on the way to the machines was to make a reconnaissance of the route over which we were to drive the "Pulls."

A "fielder's choice"

Our reconnaissance showed we would have a couple of inches side clearance on the narrowest bridges and would have a "fielder's choice" on one underpass. The operators we picked up from the battalion turned out to be one man with tractor experience, and two truck drivers who had never heard of a Tournapull. Luckily we had a good diesel mechanic; he was the secret of our questionable success.

We found our machines were already assembled, having been shipped as deck cargo. We put the truck drivers on the units and set up an impromptu instruction school that was a model of condensation. Driving the big earth-movers in an open field is job enough in itself, but we had to put them across bridges with only a few inches clearance. After making adjustments and servicing the machines the scrapers were loaded with steel forms to be used in pouring concrete—a typical example of utilizing all shipping space.

We pulled out early in the morning to avoid as much traffic as possible. Our route was to take us over three different types of roads and was almost 300 miles long. Shortly after leaving we had to cross a river bridge that was constructed on the boulevard pattern with roadways on either side of center railroad tracks. I sent a truck ahead to stop traffic, since we had to cross the bridge on the right side (wrong side in India) to have clearance. The first unit had proceeded about fifty yards when further

gress was blocked by a staff car had evaded our traffic control had proceeded on to the bridge. eveloped that some general was in rry and had decided to ignore our ficial M.P.s so over he came. er than lose valuable time in an ment that we were destined to our operator backed off, the gen- departed and we proceeded on way.

rom alleyways to open country

e next 25 miles were like driving gh the alleys of any American except that even the largest rican city hasn't a net of alley- to compare with the average In- town. Eventually we hit the open try. The highway, the best in , was almost a tangent, with a dam surface varying from 8 to . wide. I had instructed the op- rs that each machine was to be ered at the airbase in one piece. orders resulted invariably in the rs monopolizing the narrower ions of the road at the expense of ock carts, camel trains, buffalo s, sheep, goats and a few holiday ssions.

ow the Tournapull looks like thing impossible, even to the age American accustomed to rate and complicated construc- equipment. I daresay that if a of six such machines were to down any American main street, would cause quite a sensation. effect in India was tremendous— tened not a little by our taking sual precaution of red-flagging achines, front, rear and sides.

Too much to understand

ny Indians head for the bushes sight of the ubiquitous jeep, but not prepared for what happened sight of the big earth movers. coolies simply stopped work azed dumb-foundedly at the ma- s from Mars. Most bullock as" hastily jumped from their and took off for the underbrush. of the women hid their faces, s merely jumped in the nearest ah"; babies yelled and dogs d.

all my life I have never seen any- like the expressions that came he faces of the Indians who re- d within vision. Right here be- me was every emotion that any- ould wish to encounter in any group—here was being asked every question that would confront a people facing the oncoming of the machine age.

Here were the dominant white men, white rulers with gigantic machines; strange men who were always in a hurry; who became impatient with the slow, hard way of doing things; men who built large airfields in a few weeks with a few hundred men and their machines, airfields that would take thousands of coolies months and years to build.

And here was biggest, loudest and weirdest machines of them all. What would these sahibs do next, they wondered? How could such a huge machine travel without front wheels? When would such machines throw them out of a job? And then how would they make a living?

And in the eyes of the younger and more intelligent natives, I saw: How can I learn to operate such a marvelous machine? How can this country obtain the wonderful machines of the Americans? How can I go to America? What wonderful things India could do with machinery!

We brought our machines to the airbases on the third day, arriving without mishap. They have been operating continuously since, enabling us to move thousands of yards of earth, and making it possible for superfortress runways to be finished before the monsoon season.

Supreme Court Denies Wage Adjustment Claim

In a decision of far reaching importance to construction men, U.S. Supreme Court recently ruled that recovery cannot be had for increased wages demanded by workers on one contract after the contracting authority (a government agency) had specified a higher minimum rate for wages on a subsequent contract on the same project.

In the case before the court, the B-W Construction Co. of Chicago held a contract for the substructure of a building. They introduced evidence to prove that start of the work was delayed by the contracting authority and that during the period of delay the contracting authority asked bids for erection of the superstructure, requiring bidders to pay higher rates to the same classes of workmen than the minimum specified in the substructure contract. When workers on the substructure learned of the higher wages specified for the superstructure, it was necessary for the substructure contractor to meet the higher wage schedule to obtain workers and to settle a strike.

Usual liability restriction

The contract contained the following provision: "The government will not consider any claims for additional compensation made by the contractor because of payment by the contractor of any wage rate in excess of the applicable rate contained herein. All disputes in regard to the payment of wages in excess of those specified herein shall be adjusted by the contractor."

Employees on the substructure contract were unionized and were working under a wage scale fixed by agreement that was in accord with the rate fixed by the contract. This agreement did not expire, by its terms, until some time after the substructure work was completed.

Lower court ruling

A majority of judges in a court below held the view that the government had in fact established higher wages for the contractor's work and was accordingly liable to pay the increased cost. Also that the government was liable because what it did amounted to a breach of its implied obligation not to render performance more costly to the contractor.

The Supreme Court held, however, that the contracting agency did not expressly set higher wage rates for the work covered by the substructure contract, saying: "The government did not stipulate that the two groups, those employed on the foundations and those employed on the superstructure, should work at the same time at different wages. On the contrary, it had every reason to suppose that the former would finish their work at the agreed rates before the latter came on the work."

Baltimore Refuse Disposal Studies Point Way for Postwar Improvements

INSTRUCTED TO MAKE a comprehensive survey of existing refuse collection and disposal conditions in Baltimore, Md., with a view to recommending modifications or improvements in these matters, a special committee of advisory engineers has found that efficiency in refuse collection in the Maryland city was increased during 1944, and that increased disposal costs are approximately proportionate to increased wage rates and general price levels.

In its report to the mayor and city council, the committee points out that while further improvement is definitely possible, particularly when labor conditions are again normal and new equipment is made available, lower disposal costs will probably be secured only by major changes in disposal methods. A partial change in disposal method was made early in 1944, when a sanitary landfill was undertaken.

Sanitary fill saves money

This fill is currently handling over 40 percent of the rubbish and garbage collected in the city, in addition to a sizable quantity of ashes and street dirt. It has also made possible the discontinuance of one of the city's incinerators, with a substantial saving in direct cost. Continuance of the land fill method of disposal is recommended, at least on the present scale, with extension whenever commensurate benefits to the city are indicated.

The committee, which consists of Gustav J. Requardt, Hiram W. Woodward, and Abel Wolman, chairman, all consulting engineers of Baltimore, makes additional recommendations as follows:

The present duplication and division of responsibility in collection districts should be eliminated. While no change is recommended in division boundaries, district boundaries should be revised and all collection services within each of the revised districts should be assigned to a single supervisor.

As rapidly as proper equipment may be obtained, and to the extent that the available disposal methods permit, the present system of separate collections for different types of refuse should be discontinued and a mixed refuse collection instituted.

Separation of refuse, as now practiced by and required by law of the householder, should be continued without change, so as to permit continuing flexibility in disposal practice. This recommendation applies to peacetime conditions and is not intended to modify any wartime salvage procedures now used by the householder.

Under peacetime conditions attempts at salvage of refuse materials have been more costly than their discard. A program of direct salvaging after the war is not recommended.

No new incinerators are recommended for early construction, since additional incinerator capacity can be deferred for several years without jeopardy to disposal operations.

Ultimately all disposal operations should be handled by the Bureau of Street Cleaning as the present system of divided responsibility does not guarantee the most efficient operation. The change should be made when continuity of professional direction of the Bureau of Street Cleaning has been assured.

A limited number of mechanical street sweepers should be purchased immediately, these machines to be operated in different sections of the city. Whenever practicability of mechanized operation for a given type of area has been proven, additional machines sufficient to cover all areas of a similar nature should be purchased and placed in service. Where mechanization of street cleaning operations is not practicable, the beat patrol method of street cleaning should be extended and the gang sweeping method eliminated, except in areas having heavy accumulations at time of cleaning.

A definite system of annual replacements in motor vehicle equipment, under which part of the fleet is retired from use each year, should be instituted. Also, sufficient modern garage facilities, as well as a fully equipped central repair depot, should be provided as soon as new construction is permitted.

During the existing shortage of manpower and equipment the employment of contractors for certain services is essential. Under normal conditions, however, contract operation are not recommended.

Efforts currently being made to enhance the dignity and standing of the Bureau of Street Cleaning, and the morale of its personnel, should be continued. To this end, states the report, consideration should be given to changing the name to "Bureau of Sanitation."

Kansas City Modernizes Street Cleaning System

Kansas City, Mo., recently inaugurated a new street cleaning and sidewalk sweeping program in the downtown district which replaces the traditional pushcart-and-broom system of sweeping gutters in daytime. Under the new program workmen sweep sidewalk debris into the gutter during the night as mechanical sweepers and flushers clean the streets, the International City Managers' Association reports.

Nineteen miles of sidewalks and streets are cleaned six nights a week in the business district, while seven miles in the hotel and theater districts are cleaned every night. The cleaning work starts at midnight and is completed by 7 a. m.

Violators fined

During the daytime the entire business area is patrolled by a city employee on a motorcycle equipped with a trash box. He picks up any paper, glass or other trash that accumulates during the day, and calls the main office of the street cleaning division each hour to get reports of complaints that require attention.

When the new street cleaning program was undertaken, Kansas City store owners were asked to place trash boxes at convenient points in the buildings. The city also placed 100 refuse containers on street corners in the downtown area. People who litter the sidewalks or streets may be given a "litter ticket".

These "litter tickets" are issued by the enforcement officer of the public works department and signed by the violator, who has ten days in which to make payment in person or by mail

From Field and Office

ORKING PROBLEMS AND TIME-SAVING METHODS FOR ENGINEERS AND CONTRACTORS

Circular Vector Slide Rule

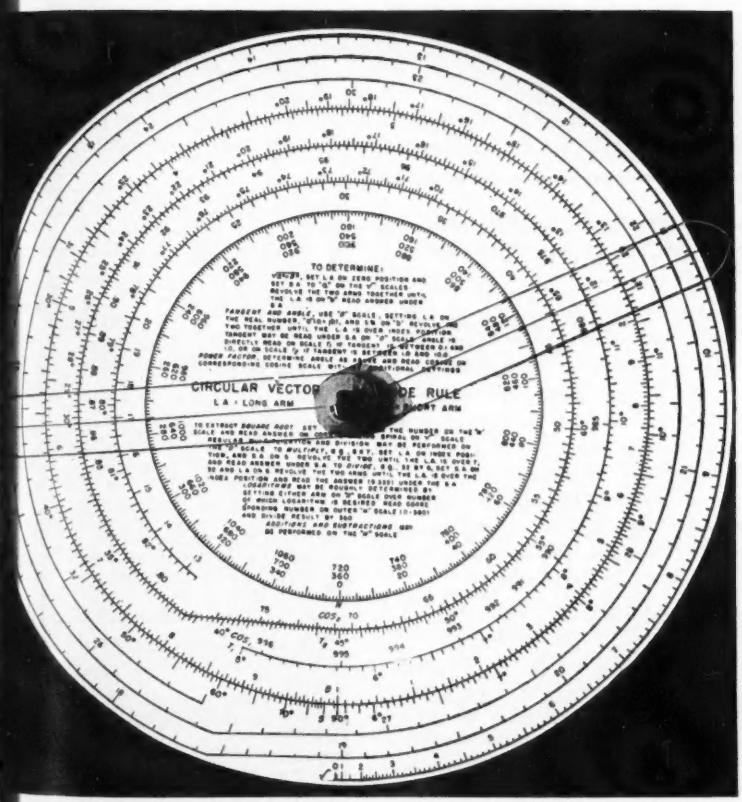
ombined ease of operation and ter accuracy than with conven- l slide rules are believed possi- y use of the circular rule shown he accompanying illustration. rule simplifies the conversion of esian to polar coordinates, while etermining the angle the cosine wer factor) may be read with no tional settings.

he unique features of the rule are: A spirally plotted 50-in. scale determining the square root of sum (or difference) of squares, (2) a 40-in. scale for determin- cosines. This scale is plotted with rence to the tangent scale instead he *D* scale, as is the conventional tice. By plotting with reference he tangent, this scale is spiralled two revolutions, thus greatly increasing the effective length of the portion of the scale between 5.7 and 90 deg.

Another effect of this plotting is that small angles may be determined even more accurately than the large ones are determined on most slide rules in current use. While conventional rules can allot but approximately 0.05 in. to the cosine of angles between 5 and 10 deg. (sin 80 to 85 deg.), this rule provides 6.5 in., making it possible to read the cosine of an angle (power factor) to four figures.

In addition to these unique scales the rule carries a complement of more or less conventional scales. The other scales included are: A 25-in. *D* scale; a 25-in. sine scale; a 40-in. spiralled tangent scale; and an evenly divided scale for use in conjunction with the square scale to square and extract square root and for determining logarithms.

The scale lengths mentioned above are based on a rule of 10-in. diameter, which is the desk model size. A 5-in. portable circular rule is also planned, in which case all scale lengths would be halved. However, this rule will provide accuracy equal to or greater than the scales now contained on conventional 10-in. rectilinear rules.—CREIGHTON W. BICKET, *Engineering Division, The Bonneville Power Administration, Portland, Ore.*



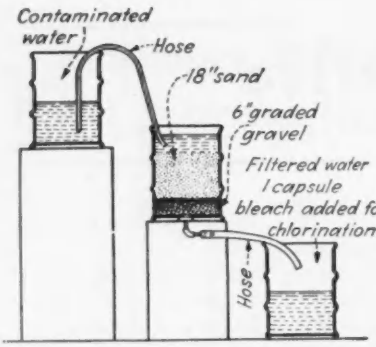
cular slide rule of this type, which is of 10-in. diameter, is expected to per- uch quicker and accurate calculations than conventional rules.

Emergency Purification of Chemically Contaminated Water

Small volumes of contaminated water can be purified by using two 36-gal. water Lyster sterilization bags as follows: (1) Fill one Lyster bag with water, obtaining the contaminated liquid in such a way as not to disturb the material on the bottom; (2) add 2 lb. activated charcoal; (3) stir for 20 min.; (4) add 1 oz. of alum and sufficient alkali (soda ash) to give optimum coagulation, these chemicals being dissolved separately in small volumes of water prior to their addition to the Lyster bag; (5) after thorough, gentle mixing, allow to coagulate and clarify by sedimentation for 30 min; (6) siphon the supernatant water through a filter to the second Lyster bag; and (7) if the results of the Chemical Warfare Water Testing are satisfactory, the water in the second Lyster bag must then be chlorinated prior to use. If the test results are not satisfactory, the treatment should be repeated.

Steel drums or other suitable containers can be used if Lyster bags are not available, as illustrated by accompanying drawing. In treating larger quantities than 36 gal., the proportion of carbon to water should be held to the ratio of 2 lb. per 36 gal.

The treatment outlined is not claimed to be effective for water poisoned with alkaloids or heavy-metal salts, which may be used by the enemy to poison water supplies. The results of the method outlined should



Emergency treatment of contaminated water using three steel drums, carbon being added at the rate of 2 lb. per 36 gal. of water.

always be checked by a medical officer or someone equally qualified. Also, it must be remembered that the usual method of bacteriological purification, including boiling and distillation, will not purify water contaminated by vesicants (blister gases).

The above description is an abstract of an item in the June 1, 1944, issue of *Construction Battalion Activities*, published by Bureau of Yards and Docks, U. S. Navy.

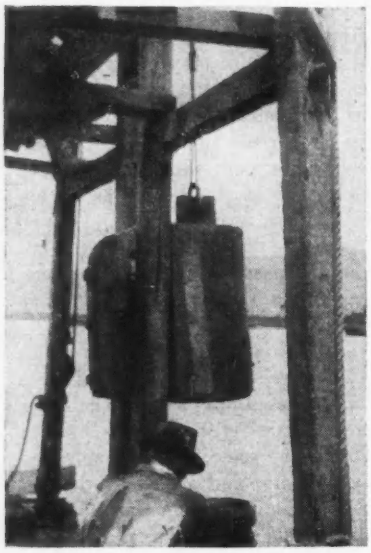
Australian "Monkey" Piledriver

The Australian custom in the design of piledriving rigs differs from ours in the matter of leads. In Australia a pile is not driven between leads. Instead vertical guides are used for the hammer and the pile to be driven is held in place against these guides with a wire rope or chain which moves down with the pile.

The hammer, usually weighing about 3,000 lb., which is the weight of the one shown in the accompanying illustration, has bolted to its rear face a heavy timber fin that projects between and beyond the guides far enough to permit a wooden key to be thrust through the fin at right angles. This key rides the rear face of the guides and prevent the hammer from leaving its prescribed line of travel.

A drawback to this arrangement, at once apparent, is that the chain holding the pile in place has to be unfastened each time the pile goes down past one of the cross braces, such as that shown in the illustration, and then has to be put on again below the brace. Piledriving operations stop, of course, during this changing of the chain, necessarily slowing up progress.

The advantage claimed for a rig of this kind is that it can handle piles with greatly enlarged butt sections, such as could not be placed between driver leads of the type used in America. Numerous trees in New Guinea and Australia have the very large butt diameters.—*N.A.B.*



Driver and guide, Australian style, include no leads between which piles can be held in place.

Field and Office Comment

Geometric Division of Circle Into Equal Parts not Practical

Sir: It must be admitted that G. Mianulli's rapid method for dividing a circle into equal parts (*ENR*, Oct. 5, vol. p. 435) is more interesting than practical. It seems rather doubtful that a draftsman would go to so much trouble, when it is so easy to "cut and try" a few times with a pair of dividers, and unless the preliminary construction work is extremely accurate the "cut and try" method must be used finally.

In proving the solution for one side of a regular pentagon inscribed in a circle, the resulting central angle is 71 deg. 57 min. 20 sec., whereas it should be 72 deg. This is an error of 160 sec. in each central angle of 72 deg., or 1 in 1620. If this error is carried around the circle, the error would be 800 sec. in 360 deg., or still 1 in 1620, rather than 1 in 8100 as stated. However, who could dete such minute errors graphically?

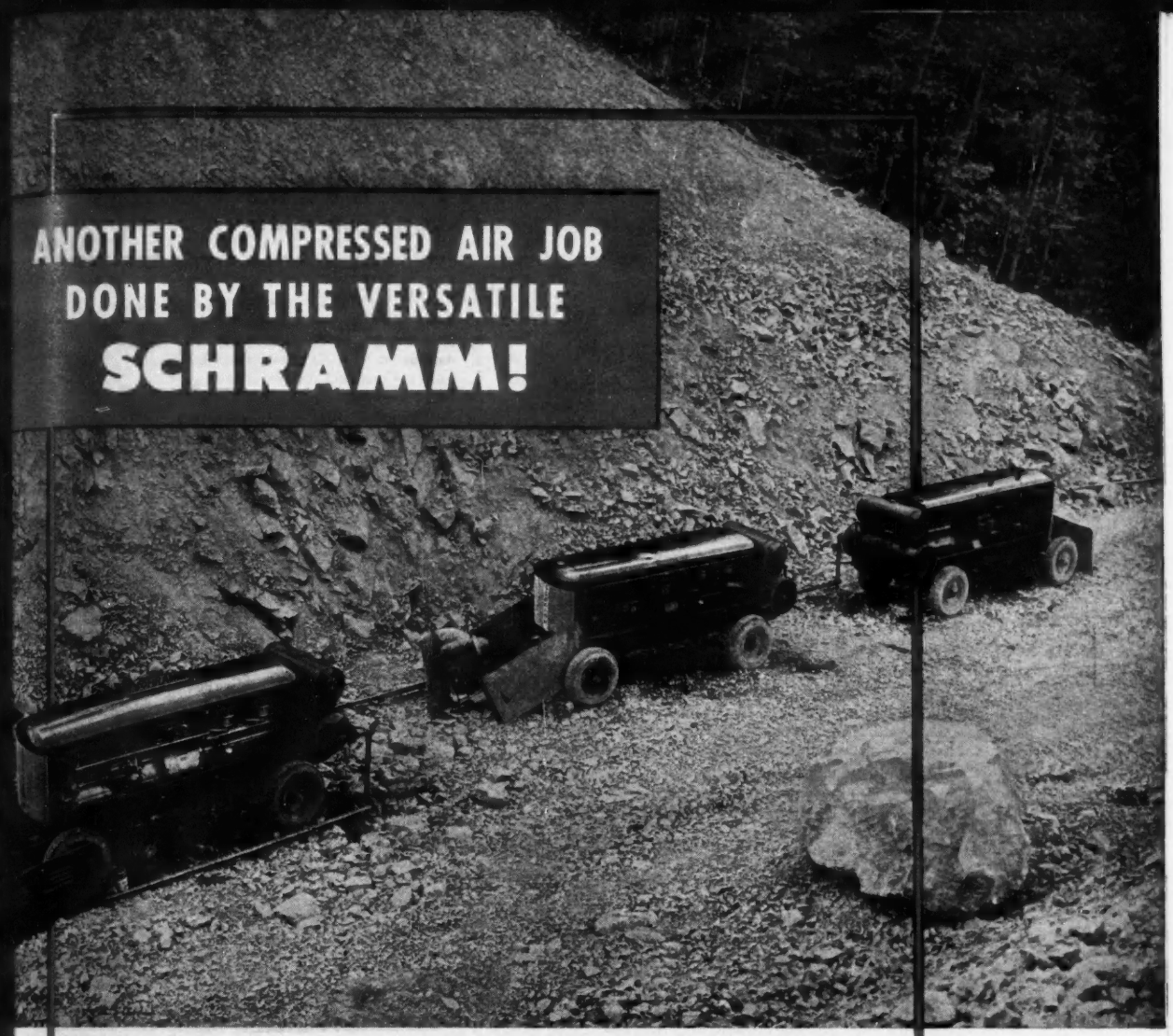
To avoid trigonometric quadrat equations, the writer wishes to of a somewhat simpler solution. W *HO* and *PO* known, angle *PHO* c be found. Then, since *OM* is know angle *HMO* can be found by the la of sines. But the sum of these t angles is equal to the exterior ang *MON*, which subtracted from 90 de leaves the angle θ.

For either solution, the distance $L = 2\frac{d}{n}$, in which d is the diamet of the circle, and n the number divisions. If this is to be a constru tion problem, the diameter should b divided into the required number parts by the regular method usi proportional intercepts between para lel lines cutting two transversals.

H. G. TAYLOR
Indianapolis, Ind.

Stairway Over 15-Ft. Penstock

Means of getting across steel pe stocks, 15 ft. in diameter, that conve water from Shasta Dam to the powe house just below it, is provided by a steel stairways that climb over th pipes at locations where stiffenin rings are used, midway between pier A feature of these stairways is a 2-i pipe curved to provide a convenie handrail, supported on posts forme by pipe of the same diameter.



You can bet this construction job needed plenty of compressed air for rock excavation . . . and promptly Schramm Air Compressors were pulled onto the job!

Schramm Compressors give you plenty of air . . . easily and quickly. Four extra features by Schramm offer savings you can't afford to overlook: (1) 100 per cent water-cooled to insure ideal year-round performance; (2) forced feed lubrication; (3) electric push button to make starting easy; (4) mechanical intake valve providing positive valve action.

Schramms are rugged, yet 40% to 50% lighter in weight for easy portability. Truly, Schramm offers so many advantages, it will pay you to write for detailed information contained in a new booklet just published. Write for your free copy today.

SCHRAMM INC.

THE COMPRESSOR PEOPLE

WEST CHESTER • PENNSYLVANIA

CONTRACT UNIT PRICES

What contractors are bidding on different kinds of construction work

EARTHWORK AND RIPRAP ALTUS PROJECT, OKLAHOMA

OWNER: Bureau of Reclamation, Altus, Okla.

PROJECT: Embankment and riprap for the reconstruction of the Chicago, Rock Island and Pacific Railway and State Highway No. 9 across the north fork of the Red River, and the riprap on the South Dike and Lugert Dike, Altus Reservoir, Altus project, Oklahoma. Work is located 23 and 17 miles north of Altus, Okla. (Spec. No. 1084).

CONDITIONS: Government to furnish concrete pipe for culverts and cement for use in mortar, and they will be delivered to contractor at Altus Dam. Contractor to furnish all other materials and complete work that will be submerged in Altus Reservoir in 60 calendar days, and all remaining work within 120 calendar days. Preference rating is AA-3. Rail and highway transportation facilities available. Wage rates are: skilled labor, $1.125 to $1.50; semi-skilled, 57½c. to $1.00; and common labor, 57½c.

BIDS: Six bids were received January 6, 1945 ranging from the low of $175,800 to $358,980.

LIST OF BIDDERS: (Combination of both schedules)

1. Brazos Valley Constr. Co., Mineral Wells, Tex. (low bidder) $175,800
2. Morrison-Knudsen Co., Inc., Boise, Idaho 180,260
3. Brown Construction Co., Pueblo, Colo. 190,900
4. Austin Contracting Co., Dallas, Tex. 194,950
5. Amis Construction Co., Oklahoma City, Okla. 287,600
6. Leo Sanders, Oklahoma City, Okla. 358,980

Schedule I

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Excavation, all classes, in borrow pits and transport. to embankmt	120,000 c. y.	$0.27	$0.35	$0.40
2. Compacting embankment	100,000 c. y.	.07	.10	.10
3. Placing ballast	3,000 c. y.	.25	.50	1.00
4. Riprap for railroad and highway	32,000 c. y.	3.45	2.90	3.00
5. Stock-piling riprap	3,000 c. y.	3.25	2.50	2.50
6. Lay 24-in. concrete pipe	120 l. f.	3.25	4.00	10.00

Schedule II

7. Riprap for South Dike	2,600 c. y.	1.35	2.30	2.00
8. Riprap for Lugert Dike	8,000 c. y.	1.45	2.50	2.50

CONCRETE RESERVOIR, SEATTLE, WASH.

OWNER: City of Seattle, Wash. C. L. Wartelle, city engr.

PROJECT: Construction of Magnolia Manor Reservoir, a concrete structure in Magnolia District, Seattle, Wash. Involves all necessary clearing and grubbing, surface stripping, excavation and embankment, high early strength cement in concrete for reservoir lining, piping (cast iron), gate valves, valve chambers, screen cages, etc., needed to complete work.

CONDITIONS: Contractor to furnish all material and complete work in 150 days. Highway transportation facilities available to site of work. Wage rates are: skilled labor, $1.545 to $1.70 per hour; semi-skilled, $1.145 to $1.495; and common, $1.145.

BIDS: Eleven bids were received January 18, 1945, ranging from the contract low of $61,139 to $113,311. These bid totals include city department charges of $2,000 for engineering, and $50 for advertising.

LIST OF BIDDERS:

1. L. Coluccio Co., Seattle, Wash. (contract) $61,139
2. Wick & Dahlgren, Seattle, Wash. 63,755
3. Rumsey & Co., Seattle, Wash. 67,884
4. Argentieri & Colarossi, Seattle, Wash. 68,838
5. Valley Construction Co., Seattle, Wash. 70,316
6. R. L. Moss & Co., Zenith, Wash. 71,525
7. Superior Construction Co., Seattle, Wash. 79,077
8. M. P. Butler, Seattle, Wash. 83,576
9. L. Romano Engr. Co., Seattle, Wash. 84,244
10. MacRae Brothers, Seattle, Wash. 95,023
11. Lidral Constr. Co., Seattle, Wash. 113,311

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Clearing and grubbing	6.9 ac.	$250.00	$150.00	$100.00
2. Surface stripping	6,000 c. y.	.30	.27	
3. Excavation and embankment (rolled embankment, 23,500 c. y.)	35,000 c. y.	.40	.43	
4. Slope dressing	1,500 c. y.	.70	1.00	1.00
5. Concrete, Class 5.5, high early str. cement, in reservoir lining	1,360 c. y.	18.00	17.90	20.00
6. Sheet copper in contract. joints	5,415 lb.	.65	.40	
7. Joint material	8,600 l. f.	.12	.22	
8. Reinforcing steel	200 lb.	.25	.10	
9. Structural steel	114 lb.	.25	.20	1.00
10. 16-in. c. i. pipe, with lugs, Cl. 200	85 l. f.	20.00	20.40	30.00
11. 16-in. c. i. pipe, without lugs, Cl. 200	279 l. f.	9.00	10.00	9.00
12. 12-in. c. i. pipe, with lugs, Cl. 200	65 l. f.	9.50	13.75	22.00
13. 12-in. c. i. pipe, without lugs, Cl. 200	234 l. f.	6.00	8.00	16.20
14. 8-in. c. i. drain pipe	175 l. f.	4.50	5.50	4.00
15. 4-in. cast iron washout pipe	185 l. f.	3.50	4.00	3.00
16. 4-in. galv. steel washout pipe	200 l. f.	2.50	3.00	3.00
17. 16-in. gate valve	1 ea.	550.00	633.00	600.00
18. 12-in. gate valve	1 ea.	350.00	415.00	435.00
19. 2½-in. flanged brass hose valves	2 ea.	35.00	60.00	31.00
20. Special valve chamber for 16-in. gate valve	1 ea.	800.00	740.00	800.00
21. Special valve chamber for 12-in. gate valve	1 ea.	750.00	640.00	430.00
22. Standard valve chamber	1 ea.	90.00	100.00	500.00
23. Screen cages	2 ea.	50.00	150.00	70.00
24. Shackle rods	20 lb.	.25	.20	1.00
25. 6-in. sewer pipe drain	335 l. f.	.65	2.75	1.00
26. Special inlets	2 ea.	35.00	60.00	50.00
27. Concrete blocking	1 c. y.	14.00	30.00	30.00
28. Concrete gutter	440 l. f.	.50	1.00	1.00

HIGHWAY BRIDGE, FLORIDA

OWNER: State Road Dept. of Florida, Tallahassee.

PROJECT: Removal of existing bridge structure over Massalina Bayou, Fourth Street in Panama City and constructing reinforced concrete bridge 496 ft. long, in Bay County, Fla.

CONDITIONS: Contractor to furnish all materials and complete work in 130 calendar days. Rail, highway and water transportation facilities available. Prevailing wage rates to be paid on project.

BIDS: Six bids were received December 19, 1944, ranging from the contract low of $90,042 to $124,777.

LIST OF BIDDERS:

1. Cleary Bros. Constr. Co., West Palm Beach, Fla. (contract) $90,042
2. C. C. Moore Constr. Co., Panama City, Fla. 93,000
3. Coggin & Deermont, Chipley, Fla. 94,910
4. The George D. Auchter Co., Jacksonville, Fla. 101,890
5. Hardaway Contracting Co., Columbus, Ga. 112,125
6. Hendry Corporation, Rattlesnake, Fla. 124,777

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Removal of existing structure	Lump Sum	$2,500.00	$3,000.00	$1,500.00
2. Concrete, Class AA, substruct.	156 c. y.	52.00	43.00	56.00
3. Concrete, Class AA, superstruct.	712 c. y.	43.00	43.00	45.00
4. Concrete handrail	993 l. f.	3.00	3.00	3.00
5. Reinforcing steel	189,790 lb.	.055	.06	.06
6. Precast conc. piling (18-in. sq.)	4,700 l. f.	7.00	7.50	7.25
7. Unloaded test piling (18-in. sq.)	45 l. f.	10.00	7.50	15.00
8. Waterproofing	2,728.1 s. y.	.75	1.00	1.00

OVER A MILLION TONS NOW . . . .

5 to 10 Million Predicted

This 24" 6-ply Bull Dog Conveyor Belt has already carried more than a million tons of heavy abrasive broken granite. The owners expect five to ten million tons more out of this belt.

Heavy duty conveyor operations demand

First — A quality standard in rubber and fabric content.

Second — Superb workmanship and "know how."

Third — The finest vulcanizing procedure in existence — the BWH Rotocure Process.

Wherever extremely hard conveyor belt installations are contemplated, be sure to get in touch with our nearest distributor or field technician, or write us direct.

BOSTON WOVEN HOSE & RUBBER CO.

WORKS, CAMBRIDGE, MASS., U.S.A.
P.O. BOX 1071, BOSTON, MASS., U.S.A.

By shaving an almost imperceptible curve on certain tooth surfaces which are conventionally made straight, Fuller has been able to reduce tooth stresses and hence add to the working life of Fuller Transmissions in heavy duty service.

Engineers call the process "crown shaving." The result is to prevent concentration of loading at the ends of the gear teeth. If that sounds too complicated, just remember that Fuller has taken every possible step to foresee and forestall the causes of trouble-some service conditions.

That's why the Fuller Transmission of Tomorrow can be expected to establish new records for value, endurance, and dependability — to be, in short, the transmission you should choose when you build or buy your Truck of Tomorrow.

FULLER MANUFACTURING COMPANY, KALAMAZOO 13F, MICHIGAN
Transmission Division
Unit Drop Forge Division, Milwaukee 1, Wisconsin

UNIT
NEW FULL VISION CAB
mobile
CRANE
SELF-PROPELLED
5 to 7
TON
Write for particulars
Powerful, fast-stepping Mobile Crane . . . one-man operated . . . for "on and off" highway operations . . . simple to operate . . . (eliminates cut-up tarvia, mutilated concrete decks and runways.)
UNIT CRANE & SHOVEL CORP. MILWAUKEE 14 WISCONSIN

The Week In Engineering and Construction

(*Continued from page* 75)

More adequate highways urged for Alaska

Inclusion of Alaska under the Federal Aid and Federal Highways Acts in order that postwar construction of an adequate highway system in the territory may be assured, was urged in resolution form at the conference of western states governors held recently in Reno, Nev.

Citing the need for modern roads in Alaska, proponents of the resolution pointed out that Alaska is at present the only territory excluded from the acts.

The western governors also adopted a resolution in support of airport development along the general lines of the federal-state program for highway construction. They went on record, however, as opposing any plan of airport construction which would by-pass state boards or constituted aeronautics commissions.

Another recommendation adopted by conference delegates urged all federal agencies concerned to provide each federal contractor with sufficient prior notice of cancellation of contract to permit an orderly, accurate and prompt payment of wages due workers discharged as the cancellation's result.

. . .

Standard promulgated for prefabricated homes

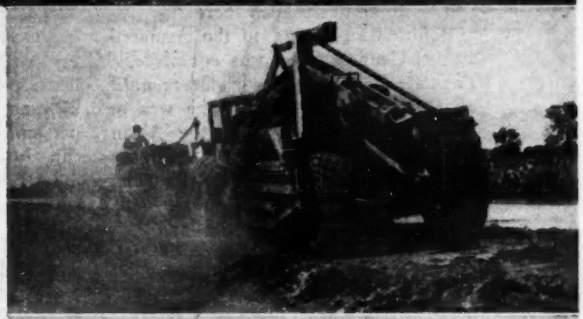
According to a recent announcement by the Division of Trade Standards of the National Bureau of Standards, Commercial Standard for Prefabricated Homes, CS 125-45, will become effective for new production this month. This specification has been circulated under date of Feb. 10, 1945, and has been accepted by a satisfactory majority of manufacturers, distributors and users.

The purpose of the standard is to establish a measure of quality for prefabricated homes. It provides requirements for one, one and a half, and two story prefabricated homes, covering structural strength of the components, requirements for light and ventilation and recommended requirements for foundations, chimneys, heating, plumbing, insulation and electrical wiring. Included also are general requirements for material, workmanship, erection at site and assembly of prefabricated units, and protection during transportation and erection.

TOURNAPULLS
Your Best Bet for PROFIT-MAKING
on all dirtmoving jobs

for Water Control:

Extensive use of LeTourneau ipment on dams, levees, canals, and other water control jects has proved Tournapulls' big yardage ability. (Above) 4 rnapulls built Lake Minnewanka dam near Banff, Alberta; owner nnix & Co. also stripped coal mines and built an airport with same rigs, profiting by Tournapull versatility.



for Roadbuilding:

Much of this work will be onstruction . . . straightening, widening, extending curves, low- g grades. Most of it involves light cuts, long trips, on-pavement lage — Tournapull specialties. (Above right) to improve drain- on 28 miles of Ill. Hwy. 66 near Serena, Dixon Construction used 2 Super C Tournapulls.

for Airports:

Plans for new and improved ds and landing strips show emphasis on shallow cuts, traffic runways, and long-haul dirt. (Right) To handle fine grading, ig rubber-tired Tournapulls hauled on and across previously aced runways at Muroc Airfield, Calif.

for Stripping:

Low yardage costs resulting Tournapull economies on long-haul dirtmoving offer extensive ortunities for contract mine and quarry stripping . . . profitable k for your men and equipment. (Right) Stripping iron ore Cedartown, Ga., 2 Tournapulls replaced shovel-trucks . . . load ore, dump to grizzly at washing plant, economically eased output for Arrington Mining Company.

for Railroad Grading:

To meet heavy, high-speed ffic needs, railroads plan extensive grade reconstruction. Many hese jobs are being handled by Tournapulls . . . definitely indi- ng another profitable dirtmoving market for contractors. (Below t) 6 Tournapulls helped move 2,300,000 cu. yds. on Rock nd relocation between Perlee and Eldon, Ia.; Peter Kiewit ons Co., contractors.

rnapulls have repeatedly demonstrated their special ability for moving in all these fields. The indicated need is for: (1) ptability to all haul lengths, (2) high-speed for quick comple- , (3) ability to handle large or small jobs, (4) hauling over ement, (5) quick, low-cost, job-to-job moves, plus (6) lowest costs for moving dirt. All these needs make Tournapulls your t bet for every one of these big, profit-making postwar markets. e plans now . . . see YOUR LeTourneau distributor TODAY.

C24A

Wm. M. Hoge nominated to be major general

Among the six brigadier generals nominated by President Truman May 3 to be promoted to the rank of major general was William M. Hoge, Engineer officer recently named commander of the famous 4th Armored Division, spearhead unit of General Patton's Third Army. Previously, as deputy commander of the 9th Armored Division of the First Army, General Hoge had carried out the brilliant tactical operations that resulted in the capture of the Remagen bridge and the establishment of the Rhine bridgehead there.

Before transferring to the Armored forces, General Hoge was equally distinguished as an Engineer officer; until about the middle of 1942, he was in charge of construction of the Alcan Highway, and then at the time of the Normandy invasion he commanded the Engineer Special Brigades that made history by clearing the beaches and then operating them to supply our whole invasion force for a period of several months.

Fifty-one years old, General Hoge is an honor graduate of West Point and a lifelong Corps of Engineers officer.

Maj. MacCullum directs personnel aid for E.I.C.

Major Donald C. MacCallum, a veteran of the Italy campaign, recently discharged from the Canadian army because of wounds, has been appointed to direct the rehabilitation and personnel services of The Engineering Institute of Canada.

With over 1,200 members serving in the active forces and a larger number employed in war industry, and because of its background of more than 25 years in the placement of technical personnel, it is believed the institute can do helpful work along this line.

Its expanded activities in this field will be directed by an advisory committee headed by Major-General Howard Kennedy of Montreal, former Quartermaster General.

Major MacCallum entered McGill University on a Canadian Pacific Railroad scholarship and was graduated in mechanical engineering in 1938. In July, 1940, he enlisted with the 27th Canadian Armored Regiment (Sherbrooke Fusiliers) and served as lieutenant and captain for three years in Canada, Newfoundland and England. After a short experience in Africa, he transferred to the 12th Canadian Armored Regiment (Three Rivers) in Italy where he served as captain and major. Wounded in June, 1944, near Florence, he was hospitalized in Italy, England and Canada.

• • •

Michigan to reimburse localities for planning

The State Administrative Board of Michigan has approved a resolution permitting the State Planning Commission to reimburse local units for planning expenditures as the work progresses. Previously, the state had refused payments until completion of the plans.

The commission has $5,000,000 available for planning under legislation authorizing up to 50 percent reimbursement. Allocations of about $3,400,000 of this fund have been approved, and applications for assistance total about $7,500,000. A request for a supplementary appropriation of $2,500,000 is before the legislature.

— LONG LIFE FOR MAGNET CABLES —

On the Rud-O-Matic Combination Magnet Reel and Tagline, both drums revolve together. In attaching the electric magnet cable, a little slack is allowed. The tagline cable is attached with sufficient tension to steady the magnet. Both cables then feed back and forth in the same relation as originally set. An inner spring on the reel drum provides the tension. With this equipment there is no chance for the electric cable being pulled apart or jerked loose from connections.

Most Crane Manufacturers have adopted Rud-o-Matics as standard equipment

Something's Got to Move

WORLD'S LARGEST MANUFACTURER OF TRACTOR HOISTS AND WINCHES

849-51

And move, it does . . . under the strong, steady line pull of this HYSTER Towing Winch. For here's controlled power with plenty in reserve to keep tractor and equipment moving under all ground conditions. Auxiliary power to supplement the tractor's drawbar pull. And wide utility service, for dozens of hoisting and towing jobs that only winch and cable can do.

HYSTERS are entirely direct gear driven and reversible in operation. All gears run in oil; all shafts turn on anti-friction bearings. Transmission case and side frames of electric cast steel stand up to severe services. Winch control levers, at driver's seat, allow operation while tractor is traveling or stationary.

Because HYSTERS are built especially for "Caterpillar" tractors, there's no time or labor lost in mounting. Frames are jig drilled for accurate fitting through regular bolt-up holes on the tractor. Mounting and service is available at your "Caterpillar" dealer.

HYSTER
Company

2953 N. E. Clackamas Street
PORTLAND 8, OREGON

1853 North Adams Street
PEORIA 1, ILLINOIS

Sold, installed and serviced by "Caterpillar" dealers everywhere.

Improved GRACO GREASE PACK

For Filling all Types of Transmissions, Differentials, Gear Cases

● The new Graco Grease Pack is designed for use in the field or shop. It is easily carried. The pump is simply constructed, easy acting, and works well with most any gear lubricant.

FEATURES

Capacity, 28 pounds • Electrically welded 4-ribbed container • Dispenses approximately ⅓ pint per stroke • 5½-foot hose assembly • Non-drip nozzle Hopper bottom—dispenses all the grease • Weight, 22 pounds • Height, 21½ inches • Width, 16 inches

Write for details and catalog 189.

GRAY COMPANY • INC.

MINNEAPOLIS 13, MINNESOTA

Upper Mississippi areas consider flood control

Under the direction of the Rock Island, Ill., district office of the U. S. Engineers several hearings have been held this month on flood control problems along the upper Mississippi River north of St. Louis, Mo. They were at Canton, Mo., May 9; Quincy, Ill., May 10; and Hannibal, Mo., May 11.

The upper Mississippi River is normally far less subject to flooded conditions than the river below St. Louis, and the Missouri and Illinois rivers. But this year extensive damage has been caused by flood waters in the Iowa, Cedar and Des Moines rivers which flow into the Mississippi from the northwest in the Davenport-Keokuk area. North of Davenport, Ia., and Rock Island, Ill., the Mississippi has been higher than usual, due to high stages of the Wisconsin River.

In January, 1937, when the Ohio River Valley experienced the greatest flood in its history, the upper Mississippi remained at normal flow. Residents of that area have frequently been spared the ravages of high waters when both the Missouri and the Illinois have been out of banks. But this year, a high crest of flood waters has poured into the Mississippi, causing widespread damage and deep concern over future possible similar conditions. The flood control conferences in upriver cities will consider plans to safeguard against possible disasters in years to come when the upper Mississippi and its Iowa, northern Illinois, Wisconsin and Minnesota tributaries reach danger points.

• • •

Alameda breakwater to cost $1,094,000

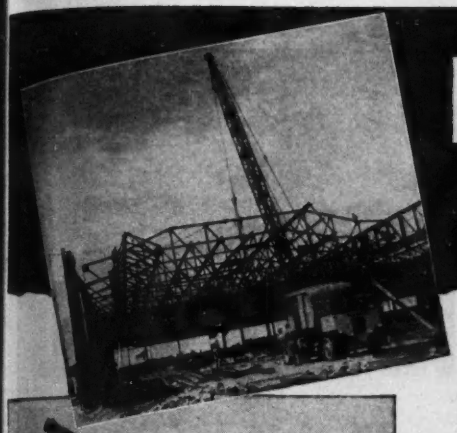
To keep open the channel and turning basin for the Navy's big aircraft carriers at the U. S. Naval Air Station, Alameda, Calif., a $1,094,000 breakwater is being built south of the station's three piers, it was announced late in April.

Dredging operations, expected to take about six weeks, were under way for the breakwater, which will serve to protect the piers and shipping from storm damage as well as to reduce the silting of the channel and turning basin. The breakwater will be a mile and a quarter long and will contain 8,000,000 cu. ft. of rock. It will be completed in one year.

The contract has been awarded to the Basalt Rock Co. of Napa, Calif., who are contractors for the retaining walls bordering the landing field enclosing the seaplane lagoon at the air station.

MOBIL-IZE FOR SPEED!

Put Your Jobs On Wheels With Lorain Rubber-Tired Shovels and Cranes



Moto-Crane erecting steel.

IN a fast moving postwar world, *speed* will be the key to greater construction profits—speed on the job—speed to cut time lost moving between jobs—and speed in converting equipment from one kind of work to another. Lorain rubber-tired shovels and cranes will help you get there fast—do it fast—and change to the next job fast!

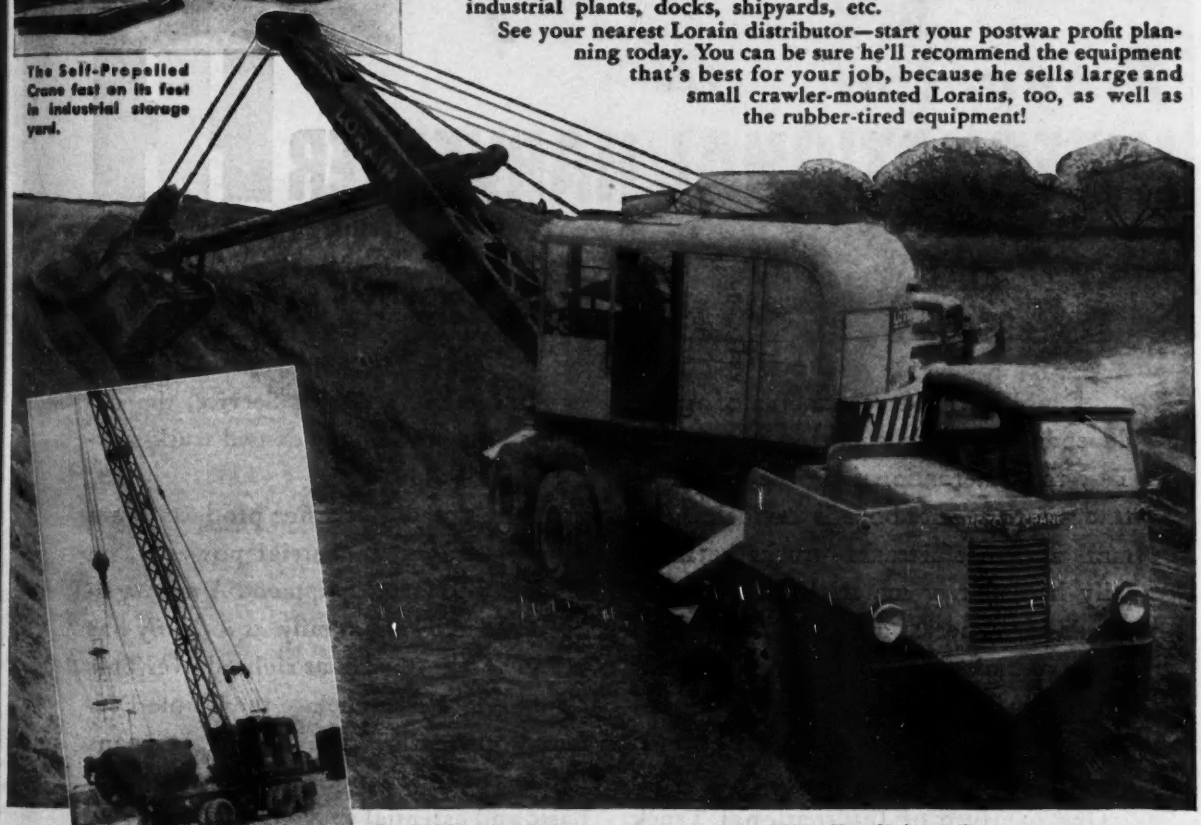
TWO TYPES OF RUBBER-TIRED MACHINES

Moto-Cranes and Shovels feature 30 MPH speed between jobs, 15 and 20 ton capacities and high on-the-job efficiency. They are available in both 4 x 6 and 6 x 6 (front-wheel drive) models.

The Lorain rubber-tired Self-Propelled Crane is operated and propelled by a single engine and single operator. This new unit has high local mobility, with speeds up to 7 MPH for quick shifts on location, and 20-ton crane capacity, and a handy carrying platform, ideal for industrial plants, docks, shipyards, etc.

See your nearest Lorain distributor—start your postwar profit planning today. You can be sure he'll recommend the equipment that's best for your job, because he sells large and small crawler-mounted Lorains, too, as well as the rubber-tired equipment!

The Self-Propelled Crane fast on its feet in industrial storage yard.



The Self-Propelled Crane transports its own load.

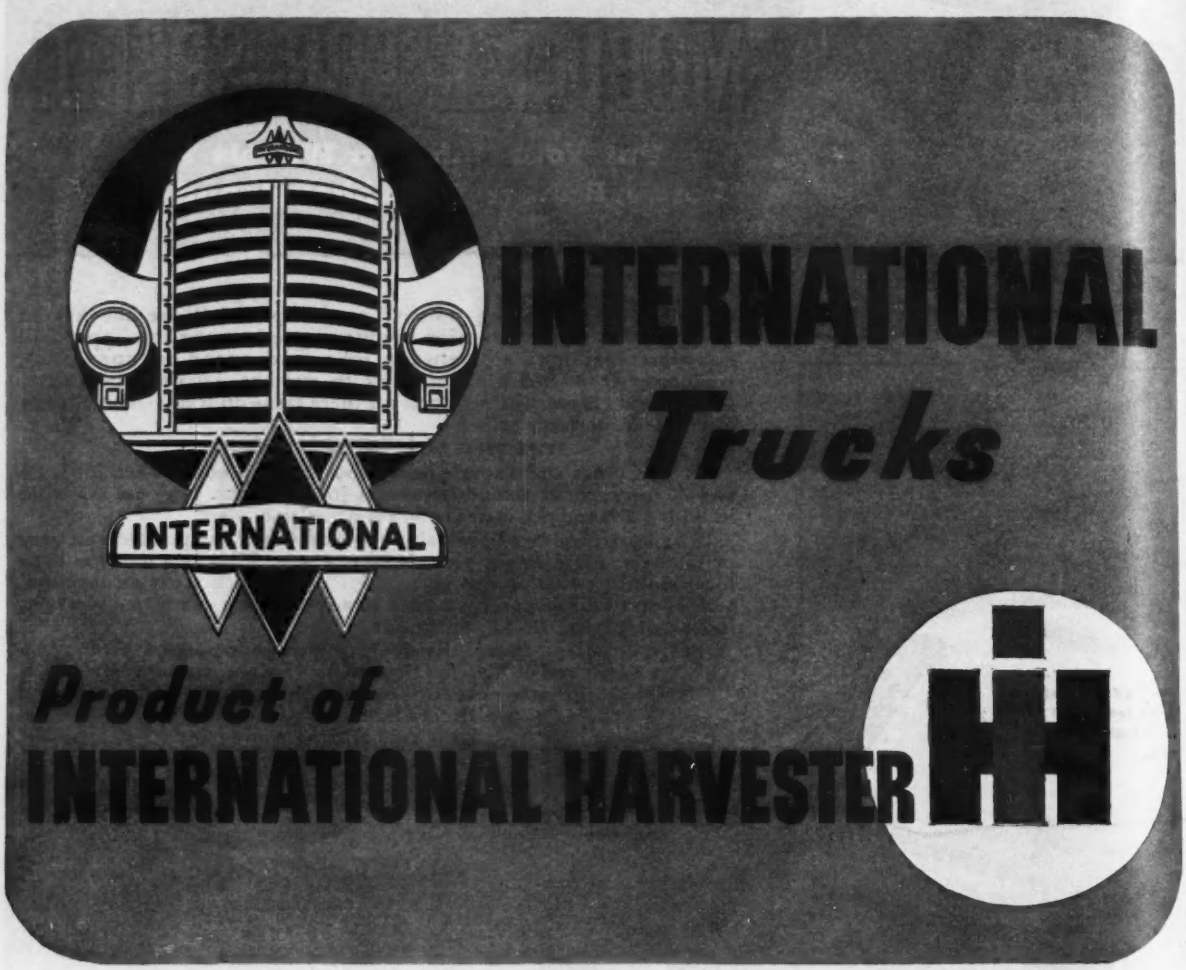
A Moto-Shovel is fast on the job—and between jobs.

Reg. Trade Mark

thew Lorain

THE THEW SHOVEL CO.
LORAIN, OHIO

CRANES • SHOVELS • DRAGLINES • MOTO-CRANES



Emblem of all-truck stamina, of rugged dependability and economical operation! Yes, the International Triple Diamond trade-mark at left above is the identifying mark on powerful trucks—trucks that faithfully hauled raw materials and finished goods for America at peace . . . that haul raw materials and finished products for America at war . . . that are fighting instruments in the hands of fighting men on Allied fronts everywhere.

One measure of International Truck quality is this—in the 10 years before the war more heavy-duty International Trucks were sold than any other make. Another is—International Truck Service, the nation's largest company-owned truck-service organization.

International Harvester products are a family—trucks, industrial power, farm tractors and farm equipment. A new symbol to identify the family *as a family* has been chosen—the IH at right above. This symbol does not displace the Triple Diamond on International Trucks. It means Product of International Harvester—vital, basic and essential to America at war and peace.

INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago 1, Illinois

INTERNATIONAL *Trucks*

New Aids to the Constructor

Dual Fuel Diesel

An internal combustion engine capable of operating on either gas or oil fuel or a mixture of both has been developed by the Worthington company. This dual fuel engine can be converted from one fuel to the other by the revolution of a single control wheel.

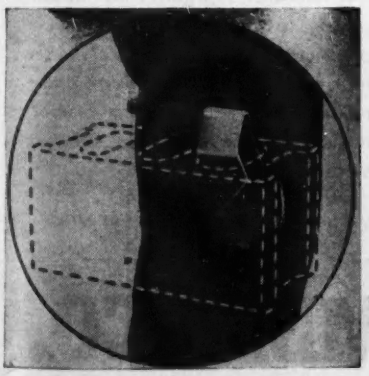
One of its most important applications is in sewage treatment plants where sludge gas recovery is practiced. By installing dual fuel engines either for generator drive or for direct connection to blowers and pumps, it is possible to operate as a straight diesel oil engine until such time as the generation of sludge gas has started. The engine then can operate as a dual fuel unit, using the gas as fast as it is generated and supplementing the gaseous fuel supply with the amount of fuel oil necessary to supply all of the plant's power requirements.

The unit is said to operate on the full diesel cycle regardless of the fuel being used, and maintains full diesel engine economy whether operating on gas or oil fuel. Fuel consumption as a gas engine is as much as 20 percent more favorable than that of a similar engine operating on the conventional spark ignition Otto cycle. The dual fuel system is applicable to the entire line of Worthington engines covering a range of approximately 150 to 2,200 hp. It is applied without any major changes in the original diesel engine.—*Worthington Pump & Machinery Co., Harrison, N. J.*

• • •

Concrete Block Lifter

Sturdy and inexpensive, a new concrete block lifter will handle two concrete or cinder blocks at a time. Not



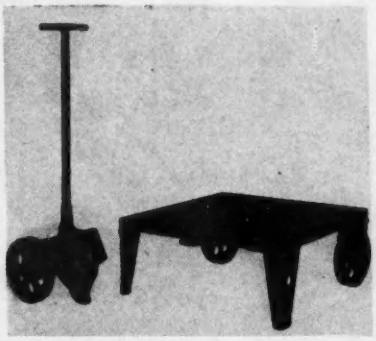
only does its use speed up loading and unloading of trucks with little exertion, but no gloves are needed and finger injuries are prevented, it is claimed.

The lifter handles blocks carefully, resulting in fewer damaged corners and edges, and masons using it can readily guide the block into proper position.—*The Michigan Silo Co., 2616 S. Washington, Peoria 2, Ill.*

• • •

Non-Skid Floor Plate Deck

Application of 4-way floor plate to the standard Turner transport chassis is said to increase considerably the various uses of this unit. The floor plate is welded flush with the top of the chassis on the angles of the frame. It is reinforced on the under side by two heavy angles. The "non-skid" feature keeps metal parts from "walking" off easily when the transport is in motion.

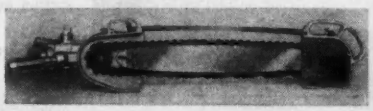


The embossments provide point contact with hot materials, which allows some air space between them and the steel deck, and thus eliminates warping. —*Factory Service Co., 4615 North 21st St., Milwaukee 9, Wis.*

• • •

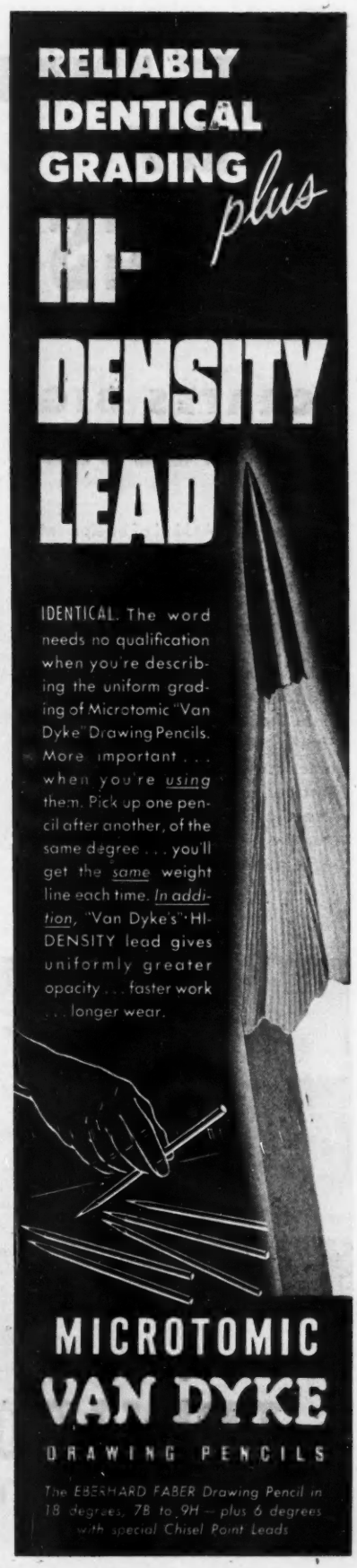
Compressed Air Saw

Large scale saw operations will be well served by a new sturdy, lightweight chain saw, according to the manufacturer. This 42-lb. model is operated by a 3½-hp. motor, at 90 cu.ft. of air at 90 lb. pressure, and has a 24-in. cutting capacity. A 5 hp., 36-in.



cutting blade is also available, as well as 24- and 36-in. electric models.

A full-length safety guard gives positive protection, and the new interlocking chain construction is said to assure maximum service. Other features include: a narrow kerf with a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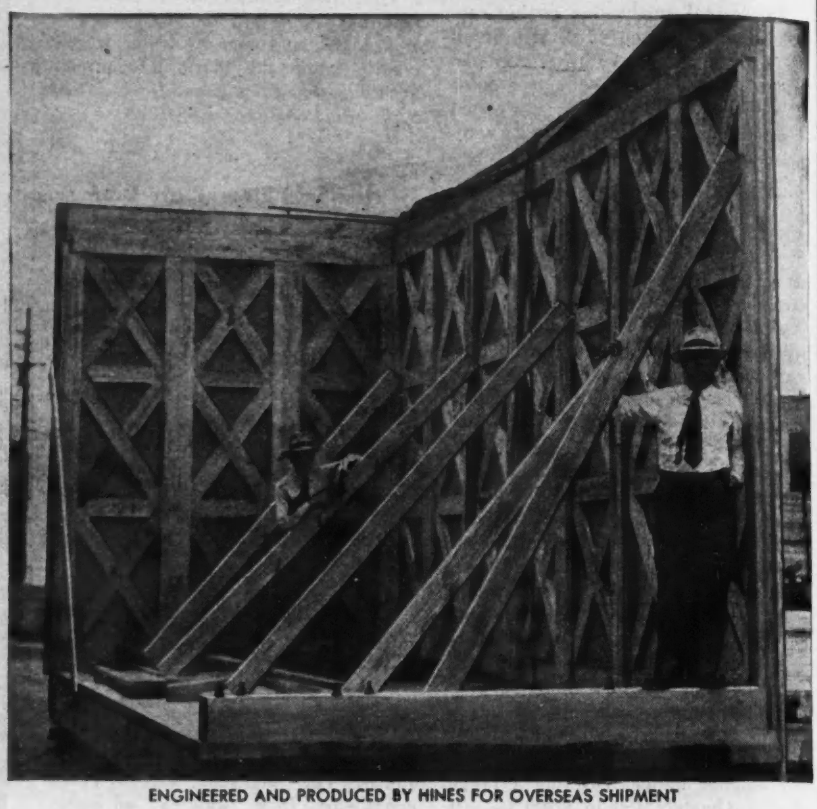
It takes the right kind of equipment, the right kind of facilities, and more important, men with "know-how," to engineer and fabricate crates that measure 29 feet long, 13 feet high, and 10 feet wide. The Edward Hines Lumber Co. in Chicago is set up for such heavy work in wood—jobs that require the shaping and boring of heavy timbers to exact specifications, and the selection of grades and species of woods to meet all use requirements. If you have a production or design problem in wood, get in touch with Hines.



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And when it comes to precise woodworking to exacting tolerance margins, Hines in Chicago is ready to produce such work on a mass production basis. We can also render aid in your engineering and design problems, and help you set up your lumber specifications as to species, grade, strength, and moisture content factors.

◀ RAILROAD HAND-CAR SUB-ASSEMBLY BY HINES

EDWARD HINES LUMBER CO.

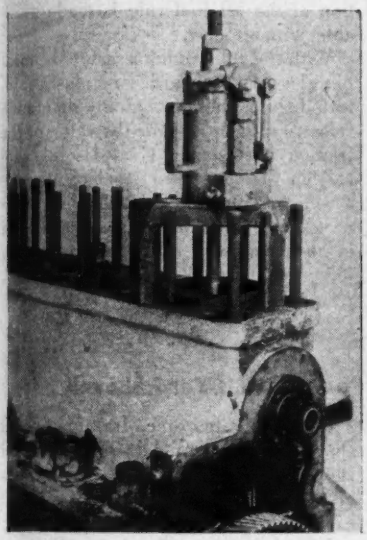
CHICAGO, ILLINOIS • ESTABLISHED 1892

sequence of only four teeth; a detachable "helper's end" which can be readily removed if the saw becomes pinched by the log, and which, when removed, converts the two-man saw to single-operator use; "one-shot" lubrication.—*Leonard Governor Corp., Ashland, Mass.*

• • •

Hydraulic Puller

Construction and maintenance tasks heretofore considered impossible are accomplished quickly, it is claimed, with the new Simplex-Jenny center hole hydraulic puller—an unusual tool that pulls straight without heavy rigging and auxiliary equipment. As its operation



is the same as that of any hydraulic jack, it is also used for lifting and pushing. Available in six models ranging from 30 to 100-ton capacity, the Simplex-Jenny generates tremendous power with little effort; its simple design and sturdy alloy steel construction insure foolproof performance under difficult conditions.

A recent outstanding use of this puller, which, in the hundred-ton size weighs only 72 lb., has been in assembly of 10,000-ton capacity drydock sections into a 10-section unit capable of lifting 100,000 tons. It will adapt itself to all engineering and industrial applications. —*Templeton, Kenly & Co., Ltd., Chicago 44, Ill.*

• • •

Chlorine Control Unit

Paralleling recent advances in chlorination procedures, a new line of La-Motte chlorine control units has been made available. A thorough survey led to improved application of chlorine in the form of free chlorine, hypochlorites and chloramines as a steriliz-

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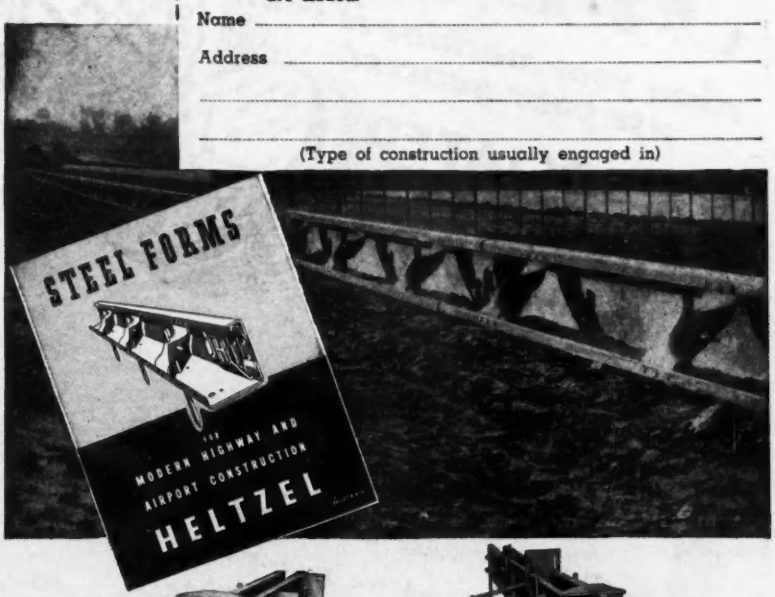
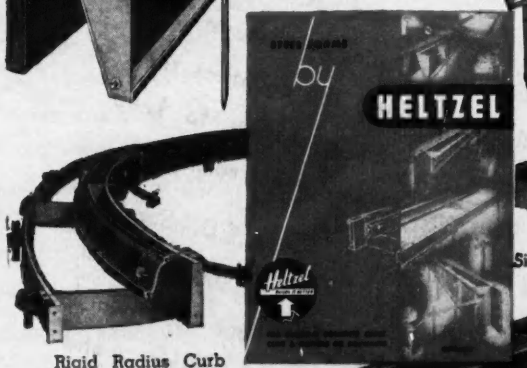


Steel Forms for Straight or Battered Curbs. Rigid and Flexible Radius Forms to match.



Steel Sidewalk Form

Rigid Radius Curb and Gutter Form.

Curb and Gutter Form with Single Bottom Radius Face Curb.

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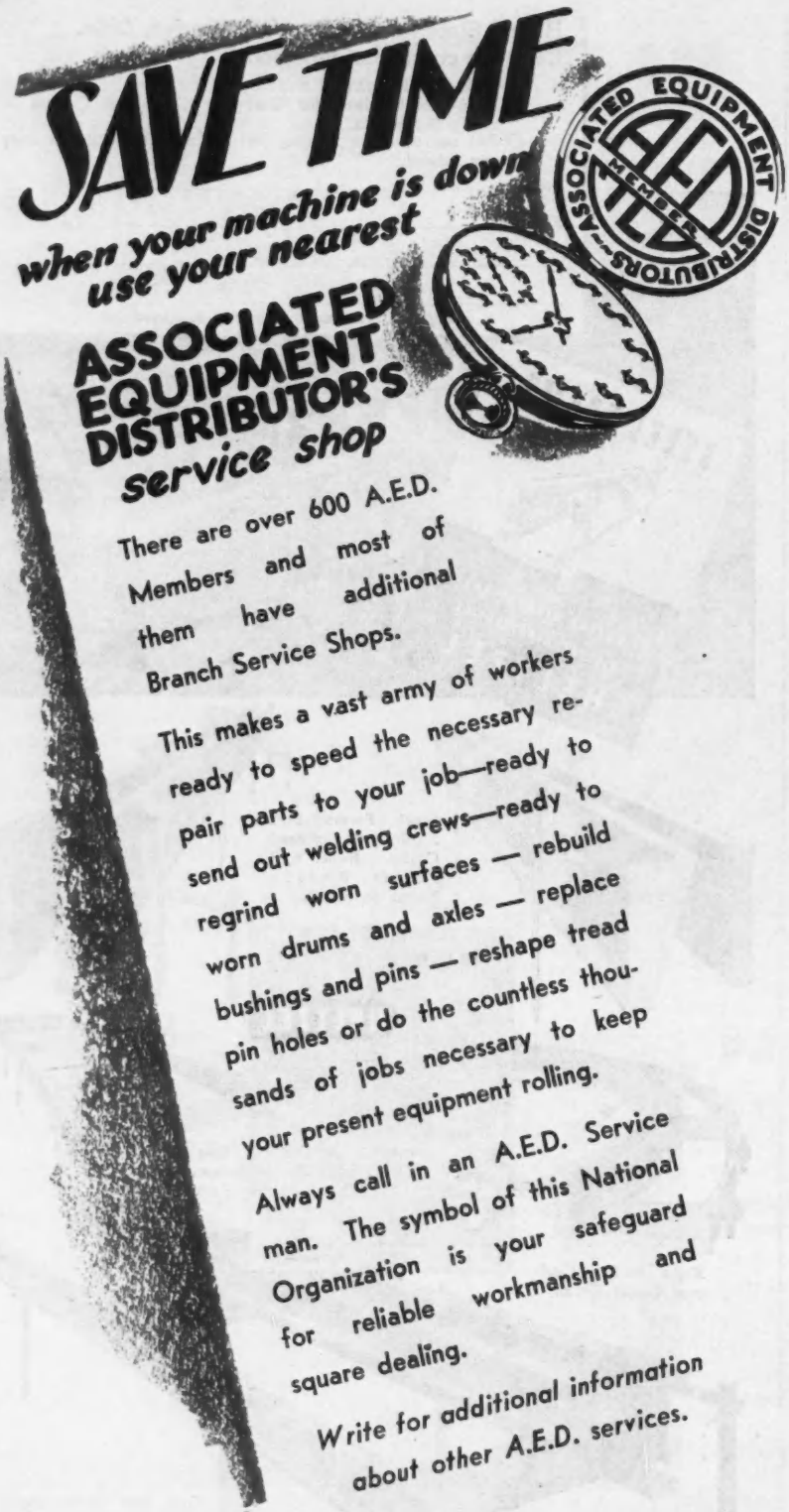
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ing agent in water treatment for municipal supply, swimming pools, condensing, cooling, sewage and many industrial uses.

The new equipment embodies the results of the latest developments in the use of the o-Tolidine method for determination of active chlorine.—*LaMotte Chemical Products Co., Towson 4, Baltimore, Md.*

• • •

Hydraulic Slide Rule

Known to sanitary engineers for many years, the Hazen-Williams hydraulic slide rule has been unprocurable in its original form for some time, due to its German manufacture before the war. Now, however, a very acceptable variation of the original rule is made available without cost.

With the rule, which is made of durable glossed cardboard with plastic protected slide, one may quickly determine velocities, quantities, or the value of the friction coefficient "C". Useful conversion factors and coefficients are shown on the back, and illustrative problems and examples are worked out in an accompanying 4-page instruction folder.—*Lock Joint Pipe Co., Box 269, East Orange, N. J.*

• • •

Half-Yard Shovel

Convertible to crane, dragline or pull shovel, a new Model 205 half-yard shovel is also available as a cruiser crane mounted on rubber tires, or it can be furnished for truck mounting.

Included among the design improvements are: same boom for shovel or pull shovel operation; trigger-fast dipper trip; independent unit traction gear case; easily removable machinery units; instant travel reverse; spacious walk-around area; head room in all parts of cab.—*Koehring Co., Milwaukee 10, Wis.*

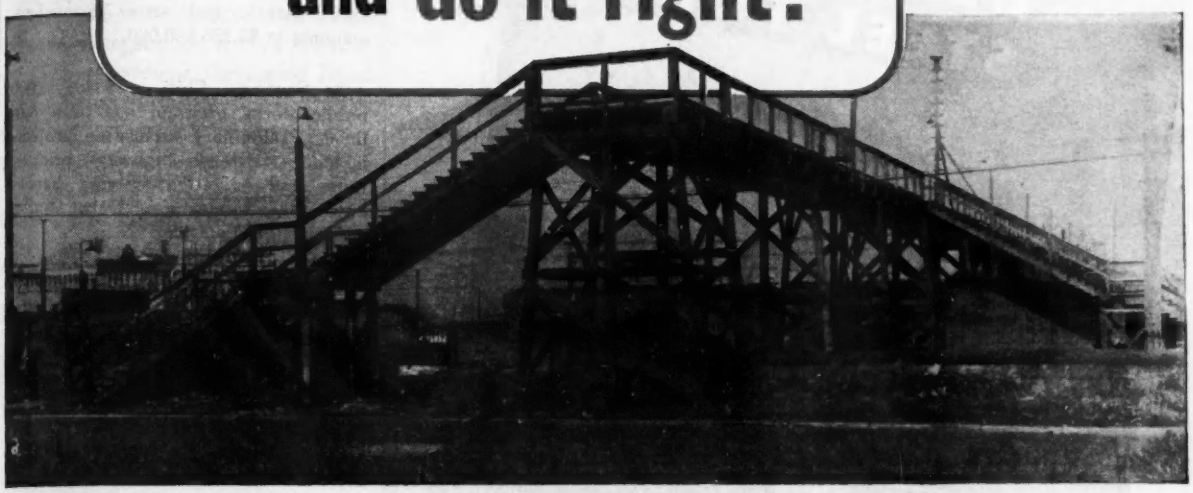
• • •

Four-Way Truck

Serving as a lift truck, load carrier, crane or tractor, the new Model L-11C combination crane-truck has improved operating characteristics because of a separate motor for raising and lowering the boom. It has a capacity of 6,000 lb. on the platform, 2,000 lb. on the hook at 42-in. radius and 1,000 lb. at 84-in. radius. It is said to travel 6 mph. with no load and 5 mph. with full load under normal conditions.

The platform, deeply flanged to insure rigidity, has three-point positive support that gives load stability.—*The Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 14, Ohio.*

PRESSURE-TREATED WOOD lets them do it now . . . and do it right!



Grade crossing elimination isn't confined to highways; a lot of plants have the same problem in connection with pedestrian traffic. A proven solution is shown in the illustration, where the entire overpass is constructed of pressure-treated wood.

Structures like this are exposed to industrial atmospheres, and also to the blast from locomotive gases, which are highly corrosive and which carry cinders that set up an abrasive action. These attacks mean continuous maintenance and frequent repairs when vulnerable materials are used. Pressure-treated wood does not corrode nor spall, and does not depend on surface coatings for durability. In addition, its first cost is low; all members can be preframed to blueprints and speedily assembled with local labor with little or no field cutting and fitting. Koppers pressure treatment forces the preservative deeply into the wood and gives lasting protection against termites and decay.

You may have overpasses, elevated plant runways, outside stairways, or similar construction jobs that pressure-treated wood can do *now* . . . and do right. Ask for our bulletin, "Economical and Permanent Construction with Pressure-Treated Wood."

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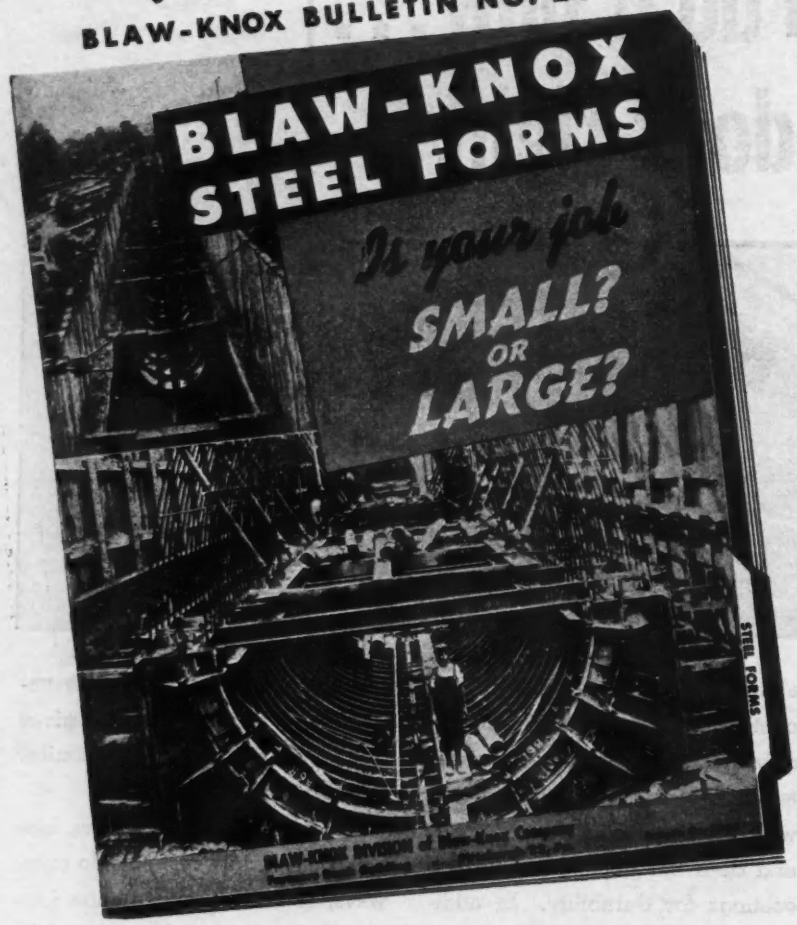

There are plenty of advantages to knowing "when and where" to specify STEEL FORMS.

For instance—PLANNING of the formwork in the case of steel forms is completed at an early stage prior to actual construction. Consequently, the engineers in charge are given ample opportunity to review the design drawings of the forms for approval or comment.

THE NUMBER OF USES—the repetition of unit pours is often the deciding factor in the specification of STEEL FORMS. There are typical methods for determining the number of uses of forms, and a conclusion can be reached as to whether or not steel forms should be used.

THERE ARE ADVANTAGES in possessing a copy of Blaw-Knox Bulletin No. 2035. This guide to *forming* should be in the files of every city engineer, municipal engineering authority, government engineer, consulting engineer, and concrete construction contractor.

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BLAW-KNOX

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BRIEF NEWS

Additional sewerage or sewage treatment is needed in 13,915 of the 16,752 communities of all sizes in the United States, according to the results of the national inventory of needs for sanitation facilities prepared by the sanitary engineers division of the U. S. Public Health Service. The estimated total cost of the entire program, which includes new sewer systems, sewage treatment plants, and sewer extensions, amounts to $2,255,150,000.

At Santiago, Chili, a $340,000,000 public works program has been outlined. Preliminary surveys on projects including railroads, highways, bridges, water and irrigation systems, harbor improvements and government buildings have been started.

The Arkansas Utilities Commission has granted the application of the Southwestern Water Co., Inc., to build a dam across Two-Prairie Bayou in Lonoke and Prairie counties, and to use the water for irrigation of rice farms. The reservoir, dam, and irrigation canals, including right-of-way and other expenditures, will cost about $260,000.

Akron, Ohio, will oppose extension of powers sought by the Ohio Water Supply Board unless the city's upper Cuyahoga River watershed is exempted from them, announced Wendell R. LaDue, water and sewer division head, who challenged the water board's finding that Akron is one of 30 districts where water shortages exists or are likely to occur.

Installation of a new 40-ton derrick is being completed on the west side of Lapointe Pier at Vancouver, B. C. It will service deep sea freighters for exceptionally heavy cargoes. Work is under the direction of Hugh W. Frith, chief engineer for the National Harbors Board. The Commonwealth Construction Co., Ltd., Vancouver has the contract.

The City Council of Houston, Tex., has voted to try for six months a new sidewalk financing policy—the city to pay 10 percent of the construction cost and allow a maximum of two years for payment of the balance by property owners who sign up voluntarily for the plan. They will be allowed 12 months to pay up to $50; 18 months to pay up to $100; and two years to pay over $100. Five percent interest will be charged on unpaid balances.

Based on Experience

ew York, Chicago, Philadelphia—the tios are respectively, 97%, 99% d 98%. Thus it is evident that top-ght engineers *continue* to endorse the dgment of four generations of water orks men.

Confidence, based on experience, is ubly important in the case of pipe to be talled underground for distribution ins. They represent the major invest-ent in a water supply system. So we say *rust the pipe you know about.*

Cast Iron Pipe Research Association, homas F. Wolfe, Research Engineer, oples Gas Building, Chicago 3, Ill.

THE 10 REQUIREMENTS FOR UNDERGROUND MAINS UNDER NORMAL CONDITIONS

LONG LIFE: In evaluating bids, the useful life of cast iron pipe is figured at 100 years minimum.

CARRYING CAPACITY: The carrying capacity of standard tar-coated cast iron pipe remains practically unimpaired for centuries. For the certain areas where tuberculating water is encountered, cement-lined cast iron pipe is available. Under such conditions, no other material offers the combined long life and sustained carrying capacity of cement-lined cast iron pipe.

TIGHT JOINTS: For ordinary pressures, cast iron bell-and-spigot pipe—for high pressures, cast iron mechanical joint pipe—are known to be leak-proof.

TENSILE STRENGTH: When tested under hydrostatic pressure to destruction, the ultimate tensile strength of cast iron pipe is a minimum of 11,000 p.s.i. for pit cast pipe and a minimum of 18,000 p.s.i. for cast iron pipe made by other methods.

BEAM STRENGTH: Under beam stress tests, 10 ft. span, standard 6" cast iron pipe sustains a load of 15,000 pounds and bends approximately one inch before breaking.

TOUGHNESS: Under hydrostatic pressure and the impact of a 50 lb. hammer, standard 6" cast iron pipe does not crack until the hammer is dropped four feet.

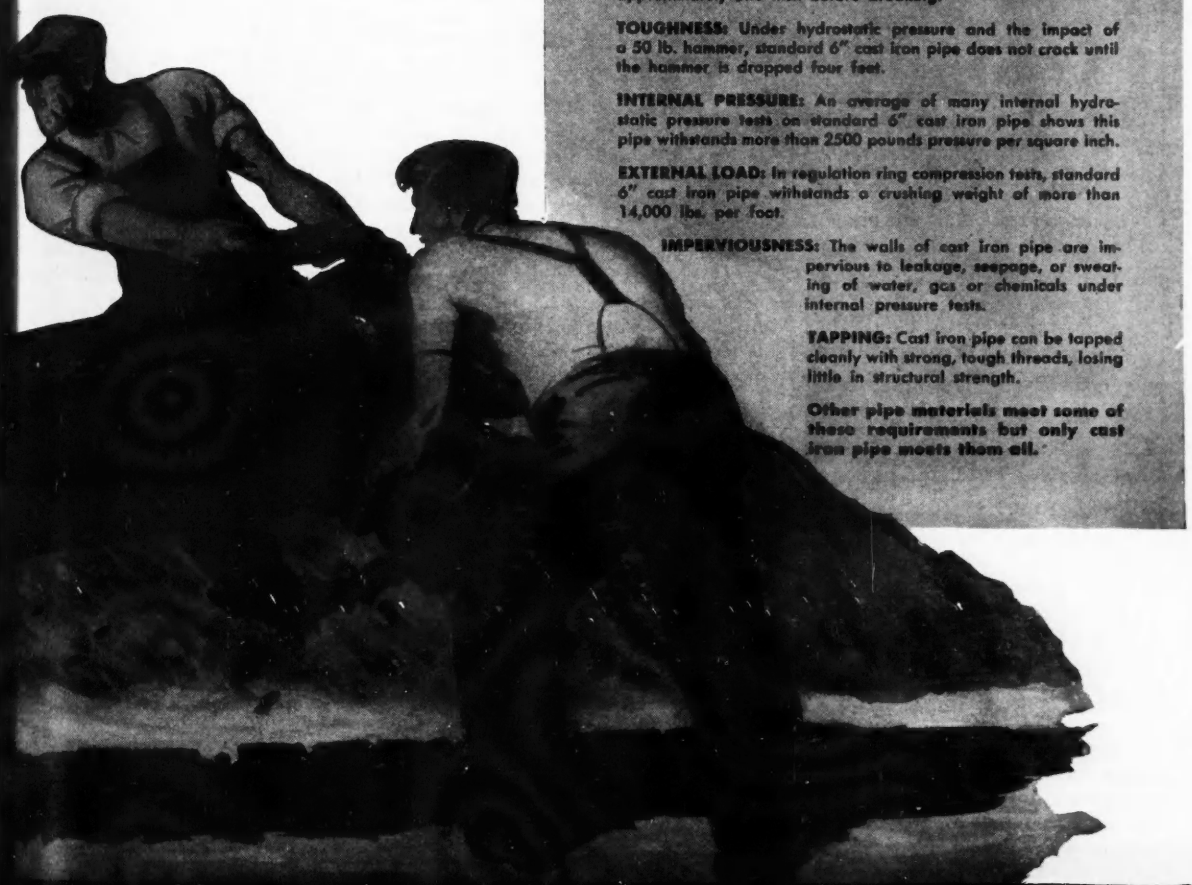
INTERNAL PRESSURE: An average of many internal hydrostatic pressure tests on standard 6" cast iron pipe shows this pipe withstands more than 2500 pounds pressure per square inch.

EXTERNAL LOAD: In regulation ring compression tests, standard 6" cast iron pipe withstands a crushing weight of more than 14,000 lbs. per foot.

IMPERVIOUSNESS: The walls of cast iron pipe are impervious to leakage, seepage, or sweating of water, gas or chemicals under internal pressure tests.

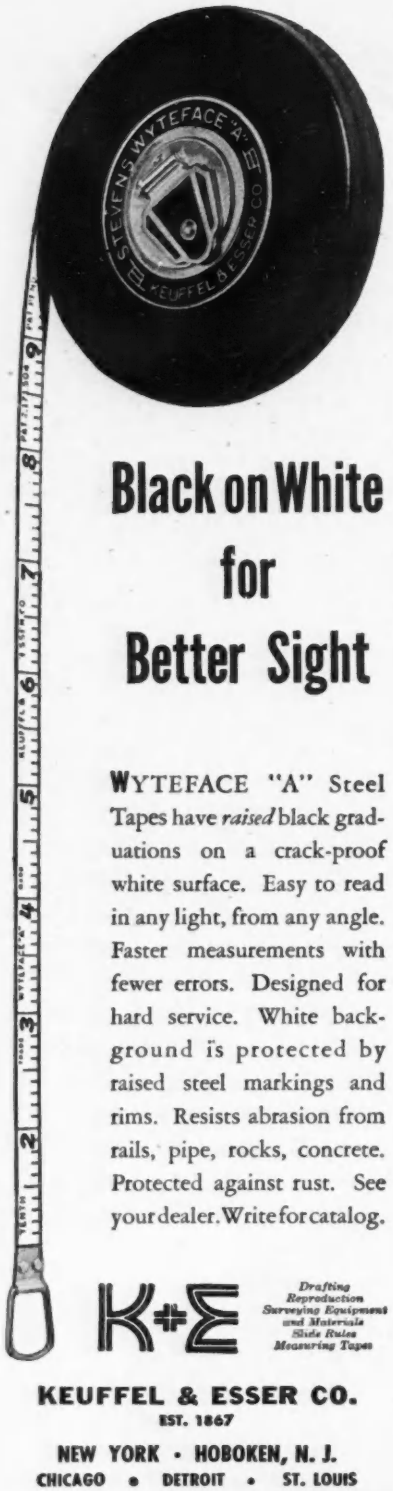
TAPPING: Cast iron pipe can be tapped cleanly with strong, tough threads, losing little in structural strength.

Other pipe materials meet some of these requirements but only cast iron pipe meets them all.



SERVES FOR CENTURIES

Tax Saver No. 1



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Elections and Activities

Recently the American Society of Civil Engineers of Dallas, Tex., held a joint meeting with the Technical Club. Col. J. T. L. McNew, vice president of engineering at Texas A. & M. College, spoke on the Army Engineer's work in the China-Burma-India theater.

J. P. Price has been elected president of the Engineer's Club of Fresno, Calif. Other new officers are J. P. McElroy, vice president; H. Wayne Stone, secretary-treasurer; and H. M. Patton, Frank Roush, G. A. Peers and J. A. Triscuitt, directors.

The Houston, Tex., chapter of the Associated General Contractors of America has elected these new officers: Otis Van de Mark, vice-president of the American Construction Co., president; Leo E. Linbeck, Linbeck & Dederick Construction Co., vice-president; and Loy Duddlesten, re-elected secretary-treasurer.

Directors: E. A. Kruse, Leo E. Linbeck, Thomas J. Bate, A. Marshall, Robert W. Collins, Otis Van de Mark, and W. S. Bellows.

Representatives of 44 Kentucky organizations have organized the Kentucky Good Roads Federation to work for ratification of the good roads amendment to the Kentucky constitution at the general election next November. This amendment would require that all funds collected from highway-user taxes be spent only for road purposes. Len B. Shouse, Lexington, president of the Blue Grass Automobile Club, was elected president of the federation, and Lewis F. Allen, Bowling Green, president of the Kentucky Farm Bureau Federation, vice president.

L. C. Crawford, Iowa City, Ia., district engineer of the United States Geological Survey in Iowa, is president-elect of the Iowa Engineering society to take office in 1946. He is chairman of a legislative committee of the engineers, architects and contractors organization advocating creation of a state building code council.

James McMillan, Calgary, has been elected president of the Association of Professional Engineers of Alberta. L. Stevens was elected vice-president and the following as councillors: C. W. Carry, Ben Russell, Edmonton; A.L.H. Sumerville, Lethbridge, and J. B. Webb, Calgary.

James C. Harding of Mount Kisco, N. Y., County Commissioner of Public Works, has been reelected president of Westchester County Chapter, New York State Society of Professional Engineers.

Other officers elected were: George T. Macbeth, Bronxville, first vice president; Reeves J. Newsom, Scarsdale, second vice president; Jackson H. Taylor, Scarsdale, secretary; William H. VanTassel, Tarrytown, treasurer; Carl Spates and Lloyd Medcalf, White Plains; and William Wenzel, Mount Vernon, directors.

The chapter now has 136 members.

Herbert D. Andress, consulting engineer, has been re-elected president of the Cleveland, Ohio, Technical Societies Council. Other officers elected were Prof. G. Brooks Earnest of Case School of Applied Science, vice-president; J. E. Wilhelm, vice-president and chief engineer of the Avery Engineering Co., secretary, and Waldemar Naujoks, chief engineer of the Steel Forge & Improvement Co., treasurer.

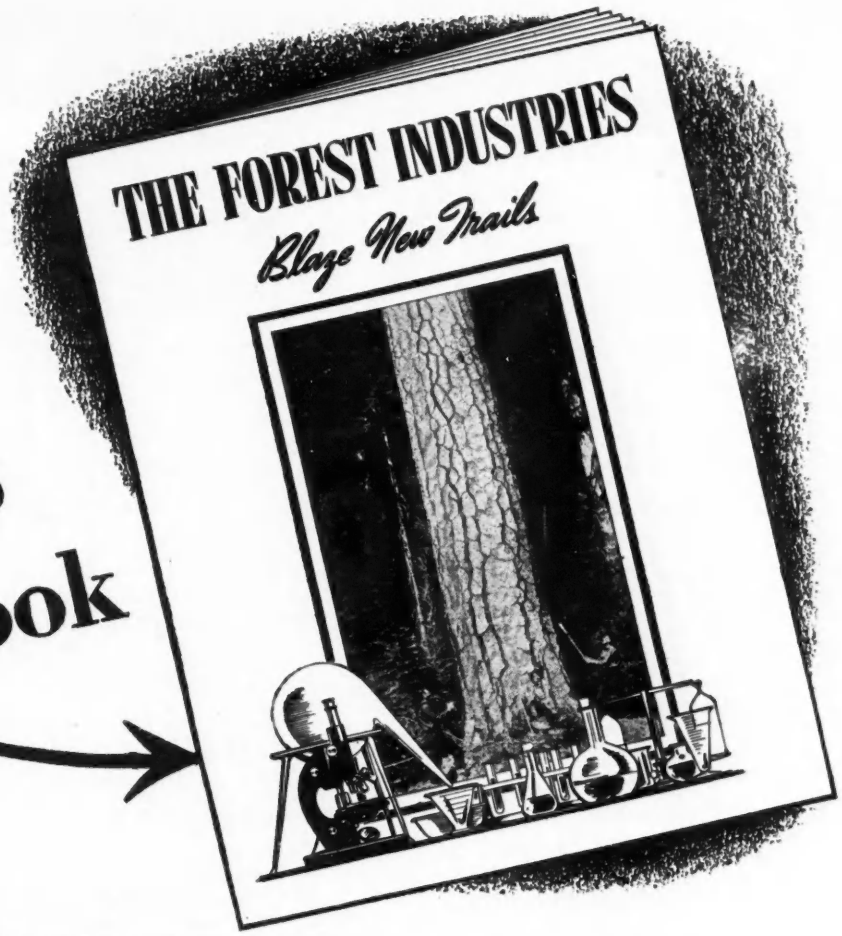
Brady Gentry of Tyler, retiring chairman of the Texas Highway Commission, is to be a director at large of the Texas Good Roads Association. Officers re-elected were Tom K. Eplen, Abilene, president; R. J. Potts, Waco, first vice-president; H. B. Zachry, San Antonio, second vice-president; Oscar Burton, Tyler, third vice-president; E. P. Craddens, Austin, secretary-treasurer; and Charles E. Simons, Austin, Executive vice-president. S. W. Henderson of Lufkin was added to the executive committee, to which W. H. Hitzelberger of Dallas and L. W. Kemp of Houston were re-elected.

Officers of the Columbus, Ohio, Home Builders Association for 1945 are: Walter J. Shapter, president; Ralph Fallon, vice-president; and Clyde Montgomery, secretary-treasurer.

Harrison S. Stocks of Las Vegas, Nev., was appointed to the Nevada State Contractors' Board early in May by Governor E. P. Carville, following the resignation from the board of S. B. James. At the same time, six board members were reappointed to four-year terms, including J. A. Anderson, Winnemucca; C. B. Isbell, Reno; E. J. Maupin, Jr., Fallon; J. C. Dillard, Reno; H. F. Linnecke, Reno, and F. C. Rowan, Ely.

H. C. Maginn, vice president of Calaveras Cement Co., San Francisco, was made vice president of No. Calif. Chapter, A.G.C., for rest of 1945 following the resignation of Ross A. Westbrook, Sacramento contractor. Al Biasotti, Stockton contractor, previously was named to fill Mr. Westbrook's position on the chapter's board of directors.

Write for this book



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This new book will be very helpful to executives, plant superintendents, chemical engineers, structural engineers and others in the wood-working, wood-chemistry and building fields.

It emphasizes the importance to all industry, of wood and its by-products and its derivatives —tells of new things ahead.

The new TECO services, now available through the Wood Products Development Shop and the Wood Chemistry Laboratory, are described for the benefit of those who may have problems concerning the physical, mechanical and chemical properties of wood and wood products. Learn how to make use of TECO SHOP-LAB equipment and technical staff in solving some of your postwar problems. Write at once for your copy—fill in and mail the coupon.

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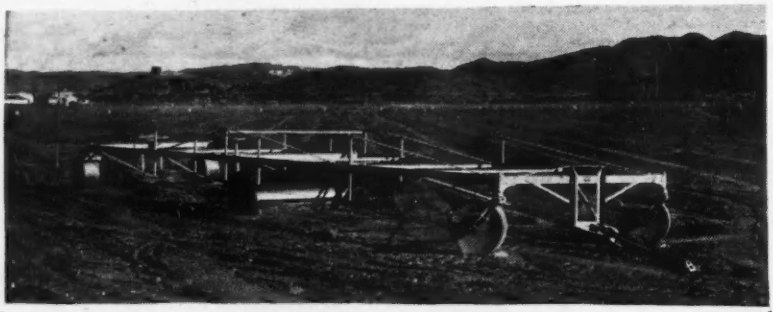

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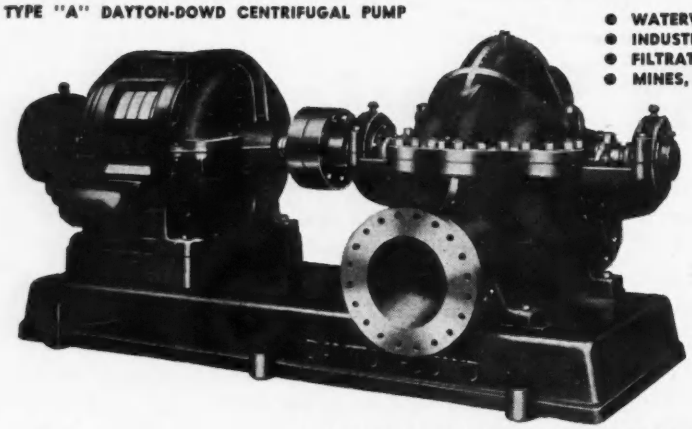

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Turbine Pumps • Centrifugal Pumps

Manufacturers' Activities

L. C. HART of New York, vice-president of the Johns-Manville Sales Corp., has been elected president of the Producers' Council, national organization of manufacturers of building materials and equipment. He replaces Douglas Whitlock, who had presided for the last two years.

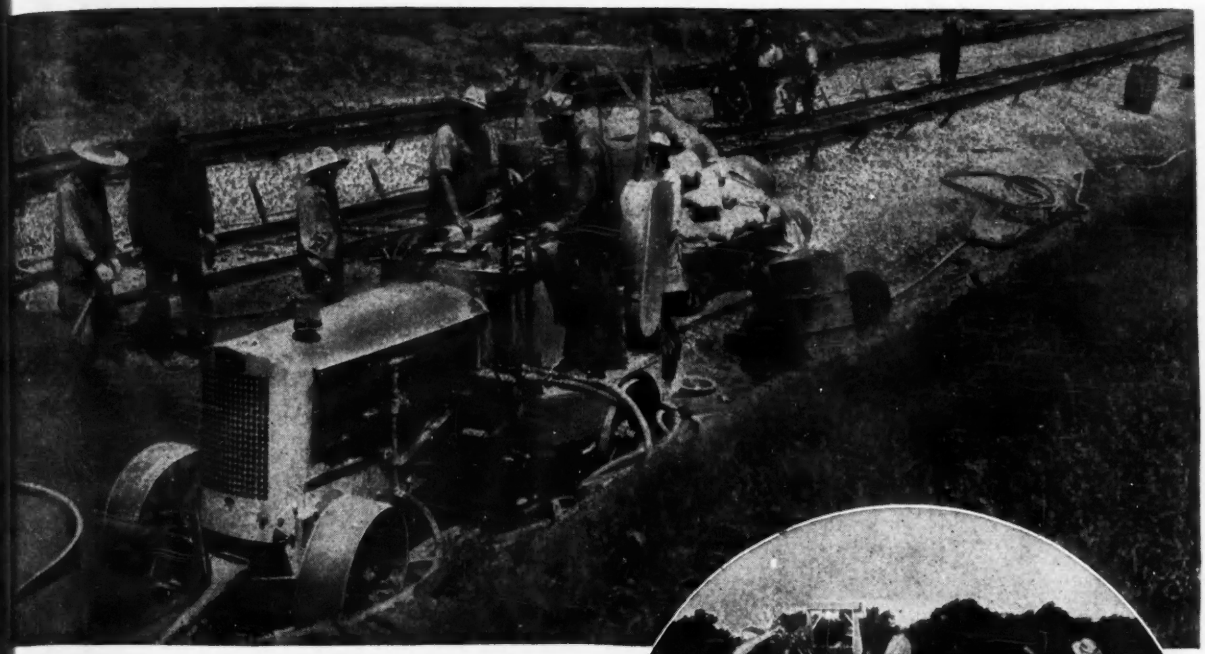
L. C. Hart

Tyler S. Rogers, Owens-Corning Fiberglas Co., Toledo, Ohio, was chosen first vice-president and Gordon C. Hay, Fiat Metal Mfg. Co., Chicago, was re-elected second vice-president. Frank A. Sansom, Chamberlin Co. of America, Detroit, continues as secretary and Allen E. Pearce, Armstrong Cork Co., Lancaster, Pa., was named treasurer. Directors are: Charles A. Snyder, Richmond Screw Anchor Co., Brooklyn; Fred L. Riggin, Jr., Mueller Brass Co., Port Huron, Mich.; Henry W. Collins, The Celotex Corp., Chicago; and Lawrence Jennings, General Electric Co., New York. North A. Wright, Libbey-Owens-Ford Glass Co., Toledo, and Irving W. Clark, Westinghouse Elec. & Mfg. Co., Pittsburgh, were renamed to the board.

AT THE ANNUAL meeting of directors of The Marion Steam Shovel Co., held recently at the company's offices in Marion, Ohio, Maynard E. Montrose was elected president and general manager. Mr. Montrose, a 42-year-old executive from Los Angeles, Calif., brings to the company a broad industrial experience. In 1922 he joined the General Electric Co. and was employed by it in various capacities until 1935, when he became associated with the Lane-Wells Co., Los Angeles. Since that time he served the company in important managerial positions and was executive vice-president until his recent resignation.

The Marion Steam Shovel Co. also elected J. M. Strelitz, Marion, Ohio

TRACK BED STABILIZATION



Koehring Mud-Jack Method

The method of track bed stabilization by which a slurry is pumped into the lower ballast or below the grade has become an important part of railroad maintenance. By this method the Koehring Mud-Jack forces the slurry through injection points which are driven into the section to be treated. Injection points are spaced at regular intervals, staggered from side to side and are always outside of the rail.

Train movement is not interferred with by the Koehring Mud-Jack Method of track bed stabilization. Water or other ballast pockets, loose fill conditions are corrected by this method.

Injection points are spaced and driven outside of rail to permit normal train movement.

Complete technical information about this method and its application to specific problems is available upon request.

ARMY E NAVY

KOEHRING

HEAVY DUTY

KOEHRING COMPANY • MILWAUKEE 10, WISCONSIN

MODERN VALVES
FOR MODERN EQUIPMENT

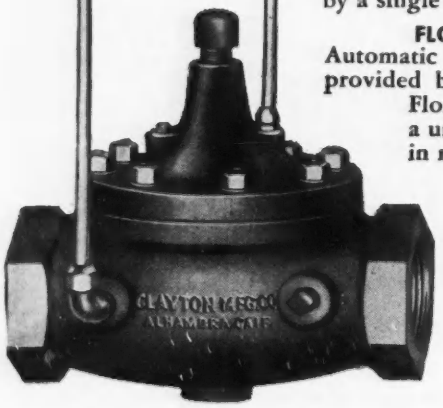
by CLAYTON

The Clayton "Feather-Touch" Pilot and the Clayton Remote Control Valve are the *modern* combination for all types of installations and equipment where valves must be opened and closed automatically or manually by remote control.

MANUAL OPERATION
A single Clayton "Feather-Touch" Pilot opens and closes single valves... or groups of valves...individually or simultaneously. The touch of a finger on the Selector Pointer of the Dial does the job...with any line pressure to 300 P.S.I.

SOLENOID OPERATION
Automatic electrical control is provided by means of the Clayton Solenoid Pilot. Single valves...or groups of valves...can be operated by a single Clayton Solenoid Pilot.

FLOAT MECHANISMS
Automatic Liquid Level Control is provided by means of the Clayton Float Mechanism...either as a unit with Clayton Valves or in remote installations in connection with any kind of tank or sump. Clayton Float Control Equipment is also available for valve operation on Separator Units handling liquids of varying specific gravity.



Write for Engineering Data • Representatives in Principal Cities

VALVE DIVISION
CLAYTON
"Feather Touch" CONTROL

CLAYTON MANUFACTURING COMPANY, ALHAMBRA, CALIFORNIA

chairman of the board and general counsel, Alec Gibson, vice-president and treasurer, John P. Courtright, vice-president in charge of sales, Harvey T. Gracely, vice-president, and M. Virden, secretary and assistant treasurer.

CRANE CO., Chicago, has announced the appointment of Lucien W. Moore as general manager of sales and branch houses, succeeding J. A. Dwyer, recently elected vice-president in charge of sales and branch houses. F. J. Wilkey, district manager, Chicago, was appointed manager of the valve and fitting department, the position occupied by Mr. Moore until his recent assignment in France by the War Department.

WARRANT OFFICER Robert C. Brown, recently returned from active service with the Navy in the Pacific, has joined the Kalman Floor Co., as superintendent of Construction in the New York area. Warrant Officer Brown has been awarded the Purple Heart and Silver Star.

C. E. MASON has been appointed technical director of the Bristol Co., Waterbury, Conn., manufacturers of automatic control and recording instruments. He was graduated from Marietta College in 1917. After service during World War I in the U.S. Army Air Service, he practiced consulting engineering in Tulsa, Okla., until 1925, which led to his specializing in automatic control problems. From 1925 until 1941 he was associated with the Foxboro Co., and for several years of that period he was director of control research. From 1940 until joining the Bristol Co., he was director of engineering of the Mason-Neilon Regulator Co.

Through invention and research, Mr. Mason has made a large number of pioneering contributions to the advancement of industrial automatic control design and engineering.

EVERCRETE CORP., New York City, manufacturers of protective and decorative coatings for masonry surfaces, is now at 424 West 42nd Street.

THE BUFFALO-SPRINGFIELD ROLLER Co. of Springfield, Ohio, manufacturers of self-propelled road and airport rollers has elected J. F. Richardson, former sales manager, as vice-president and secretary.

Except for service in the armed forces for about four years before, during and

"NO DELAYS ON THIS JOB"

"Yes—the job's moving right along, and we expect to finish ahead of schedule. One reason is we ordered all the steel for the job from one concern—Bethlehem. Everything arrived right on the dot—not a minute's delay while we were held up for material. The time and trouble that saved! We sure are sold on Bethlehem Road Steel Service, after this experience!"

Here's something to think about in planning postwar highway-building:

To keep the job moving fast, contractors can count on Bethlehem to supply all the material, and supply it fast. Bethlehem makes all the steel needed to build a highway, street or any type of bridge. When a contractor buys all the steel for a job from Bethlehem he obtains everything he needs on a single order, with most of the items shipped from one of Bethlehem's handy warehouses. The entire order is carefully co-ordinated, handled as a unit, with shipments scheduled so that he gets each item of steel as he needs it.

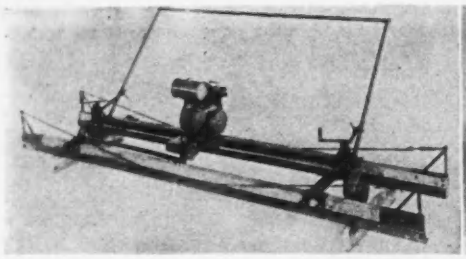
It pays—in time, money and trouble saved—to make Bethlehem your headquarters for all the steel products used in building highways, streets, roads and highway bridges.

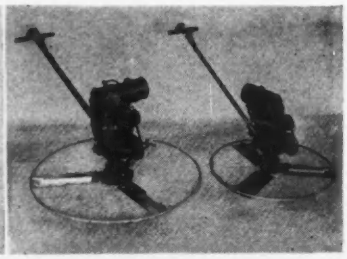
Bethlehem highway products, listed here, are sturdy and reliable—designed and built for rugged performance. For full information about them, get in touch with the nearest Bethlehem district office, or write direct to Bethlehem Steel Company, Bethlehem, Pa.

Bethlehem Steel for Highways

ROAD JOINTS • DOWELS • DOWEL BAR SUPPORTS • CENTER STRIP • WIRE ROPE AND STRAND • BAR MATS • BAR TIES • ANCHOR RODS • GUARD RAILS • GUARD POSTS AND BRACKETS • PIPE • HOLLOW DRILL STEEL • DIGGING BARS • STRUCTURAL STEEL • MOLD BOARDS • CONCRETE REINFORCING BARS • BRIDGE FLOOR REINFORCING • CORRUGATED SHEETS • BAR SUPPORTS • TURNBUCKLES • TIE RODS, SPIKES, BOLTS AND NUTS • RIGHT-OF-WAY FENCE AND POSTS • TIMBER BRIDGE HARDWARE • SHEET AND H-BEARING PILING

BETHLEHEM STEEL





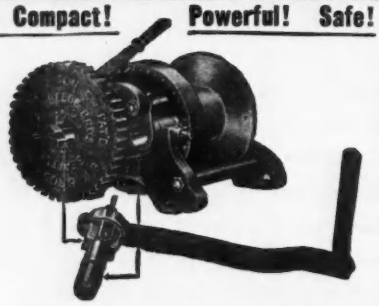
Whiteman CONCRETE EQUIPMENT

Has proved its value in saving labor and speeding construction on many national and foreign projects. The WHITEMAN Rodding Machine, the dual purpose Floating-Finishing Machines in two sizes, the Screed Stake Cap and the Hand Grill Tamper (illustrated at right) are available on properly rated orders.

For information see your nearest distributor or write direct.

Whiteman MANUFACTURING CO.
3249 Casitas Avenue — Los Angeles 26, California

Compact! Powerful! Safe!



DISTRIBUTABLE CONTROLLED POWER

with Beebe Bros. ALL STEEL HAND HOIST
SEATTLE, U.S.A.

Money Has Been Saved on These Jobs

1200' assembled pipe (132 Tons) were lowered to bed of Mississippi at St. Paul with 9—5-Ton Beebes, three lines to each hoist through blocks.

Hudson River Bridge sidewalks were laid in sections with 32—5-Ton Beebes.

22 Beebe hoists raised, held and controlled one of world's largest tents over Mud Mountain Dam in Washington State.

★

When raising, lowering, or placing costs by power are a serious problem, the answer is the right number of Beebe Bros. All Steel Hand Hoists MANNED IN UNISON. Available in 2, 5 and 15 Ton sizes. Sold through leading dealers in all trade centers. List of dealers sent upon request.

BEEBE BROS., 2720 6th Ave. S., Seattle 4, U. S.

★

"THE STRONGEST GEARED POWER FOR ITS WEIGHT IN THE WORLD"

★ YOUR ★
WASHINGTON
★ STAY ★

For business and government contacts, choose the LAFAYETTE, 2 blocks from the White House — near other government buildings — a stone's throw from downtown. The location is quiet—room comforts relaxing—and, for the epicurean, there's the

LAFAYETTE ROOM

. . . Colorful mealtime setting . . . Celebrated food . . . Drinks of extra cheer

Please reserve in advance

HOTEL LAFAYETTE
16th & Eye Streets, N.W.
WASHINGTON, D. C.
A JEFF FORD ENTERPRISE

after World War I, Mr. Richardson has devoted his entire career since 1904 to the marketing of heavy construction equipment.

ON APRIL 2, 1945, the entire Milcor Steel Co., operations at Canton, Ohio, was moved to Cleveland. In that city Milcor manufacturing and sales will be co-ordinated with those of The J. M. & L. A. Osborn Co., which was recently purchased by Milcor. The new name is The J. M. & L. A. Osborn Co., division of Milcor Steel Co. 1541 East 38th Street, Cleveland 15, Ohio.

BERNARD GOULD has been appointed general sales and advertising manager of the Aeroil Burner Co., Inc., of West New York, N. J. This company manufactures industrial heating equipment. Branch offices are in Chicago, Dallas, and San Francisco. Ed Skillman, formerly with the National Association of Manufacturers in New York, has taken over the Weed Burner division as assistant sales manager.

THE CHICAGO BRIDGE & IRON CO., has reopened its Los Angeles office at Room 1105 in the William Fox Building.

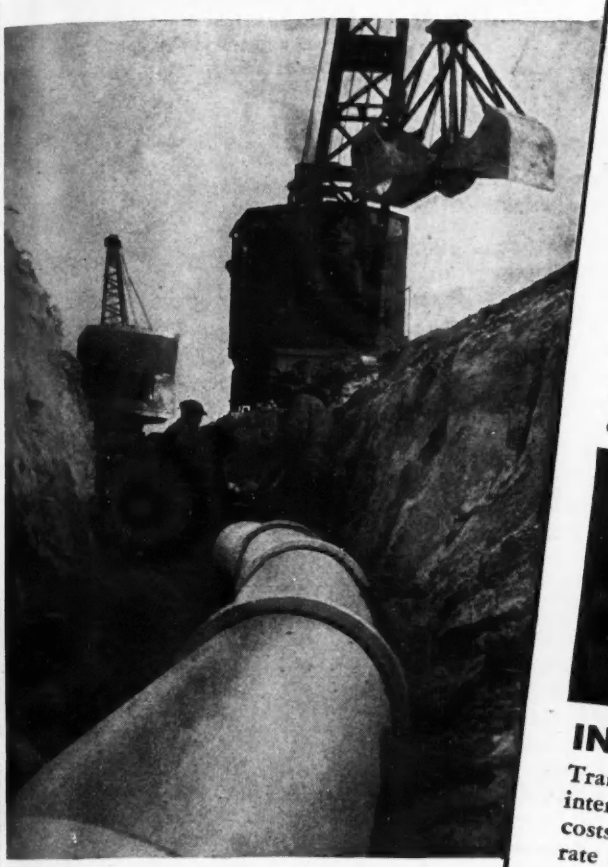
The office is in charge of Dean E. Stephan who, for the last several years, has been assistant to James C. Vosburgh, manager of the company's office in Washington, D. C. Before going to Washington, Mr. Stephan was a member of the Birmingham, Ala., sales office staff.

WALTER A. RENTSCHLER, vice-president and secretary of the General Machinery Corp., Hamilton, Ohio, has been elected vice-president and treasurer, succeeding the late Col. Sidney Waldon. J. E. Peterson, a former vice-president, was named vice-president and secretary.

THE GRIFFIN ENGINEERING CORP., southern branch of the Griffin Wellpoint Corp., New York City, has moved to 2016 East Adams Street, Jacksonville 2, Fla. Neill N. Payne is manager. Among the services rendered there are the rental and sale of wellpoint systems, centrifugal pumps 1½ to 10 in. in size, portable engine-driven generators and portable floodlighting equipment.

THE BOARD of directors of the Bituminous Concrete Producers Association, Columbus, Ohio, has selected Lloyd Burgess as engineer-director, succeeding Fred E. Swineford. Mr. Burgess has had more than 20 years of highway ex-

IT *RESISTS* CORROSION

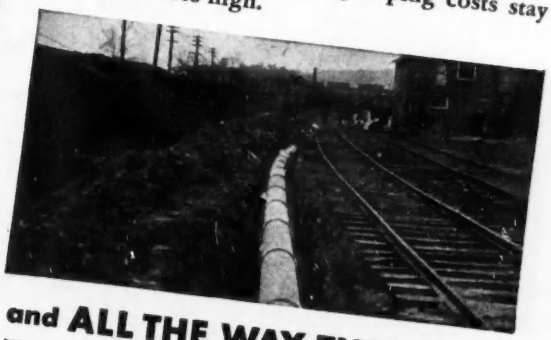


OUTSIDE

Transite Pipe is stubbornly resistant to soil corrosion. Thousands of successful installations, many of them in highly corrosive soils, testify to its stability under a wide range of service conditions.

INSIDE

Transite Pipe cannot tuberculate. This costly internal corrosion that increases maintenance costs can never choke off its initial high flow rate (C=140). As a result, pumping costs stay low, pressures high.



and ALL THE WAY THROUGH

Transite Pipe resists destructive attack. Made of asbestos and cement bonded together under great pressure, its ability to provide efficient, economical water transportation has been proved in thousands of installations.

EASY HANDLING is an additional advantage of Transite Pipe. Its light weight means more footage carried per truck load, fewer men required for handling, lower transportation costs. And in the trench, the Simplex Coupling assures quick, easy assembly, even with inexperienced crews.

For full details, write Johns-Manville, 22 East 40th Street, New York 16, N. Y.

JOHNS-MANVILLE JM PRODUCTS

Johns-Manville ***TRANSITE PIPE***

FOR EFFICIENT, ECONOMICAL WATER TRANSPORTATION

NO FEAR

of Arkwright Tracing Cloths becoming yellow or opaque with age!

NO PEER!

Because of special processing, Arkwright Cloths are the recognized tops in *lasting* transparency.

HEAR! HEAR!

Free sample of these highly and permanently transparent tracing cloths for the asking! Just write: Arkwright Finishing Company, Providence, R. I.

Sold by leading drawing material dealers everywhere

Arkwright
TRACING CLOTHS
AMERICA'S STANDARD FOR OVER 20 YEARS

perience. He served for several years as assistant to the bituminous engineer for the Ohio Highway Department. The association was formed in August 1943, as a non-profit group to extend the use of bituminous concrete and improve its quality through study and research of the techniques of mixing, spreading, and finishing, according to Guy F. Atkins, executive secretary.

H. J. RYAN has been apointed sales manager of the construction machinery division of the Southwest Welding & Mfg. Co., Alhambra, Calif. Mr. Ryan was formerly with the Worthington Pump Corp. with head- and Machinery quarters in St. Paul, Minn., and more recently with the Navy Department, Bureau of Yards and Docks at Chicago, Ill. In his new capacity he will direct sales of hauling scoops, bulldozers, power control units, track cranes, tamping rollers, heavy duty rippers, dump bodies and other construction equipment.

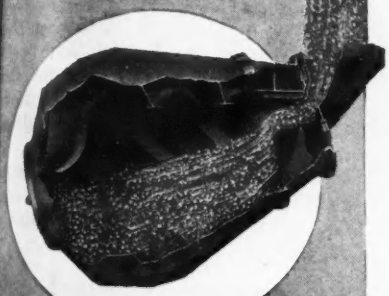
JOHN J. BERGEN, chairman of the executive committee of Gar Wood Industries, Inc., Detroit, Mich., has also been elected chairman of the board of directors. Mr. Bergen was in addition named chairman of St. Paul Hydraulic Hoist Co., a subsidiary.

A long-time member of the Naval Reserve and a graduate of the Naval War College, Newport, R. I., Mr. Bergen went on active duty early in 1942. He served as chief staff officer at the Naval Air Center, Espiritu Santos, New Hebrides, and subsequently as chief staff officer of the Naval Air Bases, Seattle, Wash.

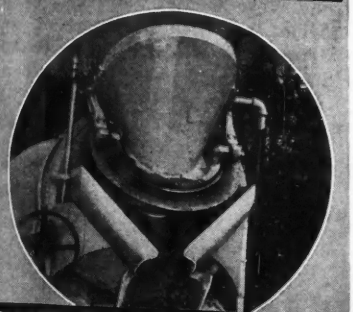
Gar Wood Industries, Inc., manufactures hydraulic hoists and dump bodies for trucks and truck-mounted winches and cranes. It also makes road machinery, tanks for transporting liquids, heating equipment and motor boats.

The motor truck division, International Harvester Co., has announced the appointment of Karl W. Freeman as southern district manager. Mr. Freeman was branch manager at Atlanta, Ga. His servcie with Harvester began at Des Moines, Ia., in 1925. He has served at the Council Bluffs, Amarillo, and San Antonio branches.

Save HOURS on Every Concrete Job with SMITH-MOBILE



IN FASTER



OUT FASTER

IN THE FORMS FASTER

Time is money! SMITH-MOBILE delivers more loads of uniformly mixed concrete per day than any other truck mixer on the market. Here's why —

FASTER CHARGING — Operator stays in cab. No hatch to open, clean and close again. Aggregates drop vertically into big, roomy feed chute and continue by gravity at high velocity toward opposite end of drum. No shafts or rods to clog up chute. Fastest loading cycle on the market.

FASTER MIXING — Drum rotates during charging operation. Shrinking and mixing start the instant a batch enters drum. This means faster and better mixing, also increased drum capacity. And while mixing, you can look into drum and SEE what's going on. No inspection delays.

FASTER DISCHARGE—Open sealing door as far as you wish, and reverse rotation of drum. Instantly the uniformly mixed concrete is discharged by gravity . . . as fast or slow as you want it . . . any quantity you desire. The speed of the drum controls the speed of discharge.

FASTER DISTRIBUTION — Smith-Mobile's high discharge permits steeper and longer distributing spout. Eliminates need for hoist or ramp, yet provides maximum radius of distribution. Even dry concrete can be poured directly into high forms, without pushing concrete down chute. More time saved!

Yes sir — SMITH-MOBILE is faster all the way. It will pay you to investigate. Write for Catalog No. 198-C.

THE T. L. SMITH COMPANY
2855 N. 32nd Street, Milwaukee 10, Wis., U. S. A.

The Original High Discharge
TRUCK MIXER and AGITATOR!

Economize on time, labor and material . . . increase profits and job efficiency . . . by using a MALL Concrete Vibrator. Greater uniformity of strength and density is attained; voids and honeycombs eliminated; bonding strength increased. Places a stiff mix concrete faster—better—cheaper. Variable speed Gasoline Engine operates 8 other interchangeable tools.

***A Type and Size for Every Job*—1½ H.P. Gasoline Powered model, also available with 3 H.P. round base or wheelbarrow mounting. 1½ H.P. Universal Electric and 7500 r.p.m. Pneumatic Units.**

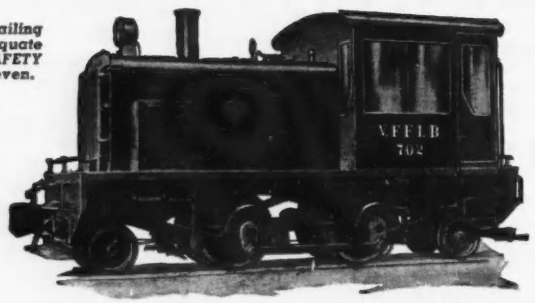
Ask your distributor or write for literature and prices.

MALL TOOL COMPANY, 7730 So. Chicago Ave., Chicago 19, Ill.

ARMY E NAVY

Mall PORTABLE POWER TOOLS

Leading and trailing trucks permit adequate speeds with SAFETY where track is uneven.



Post-War TON-MILE COSTS

—will be closely ANALYZED

DAVENPORT LOCOMOTIVES

We are winning this war at ANY cost—but—the huge volume of post-war public works will—and MUST—be carried out WITHOUT unnecessary waste.

That's why Davenport Better-Built Locomotives will be the logical choice on projects employing rail haulage.

These superb performers, modern in every respect, stamina-built and lasting, will deliver the low cost haulage required to justify your competitive bids.

Better-Built DAVENPORTS are AVAILABLE in STEAM, GASOLINE DIESEL with ELECTRIC or MECHANICAL DRIVE

ARMY NAVY

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DAVENPORT LOCOMOTIVE WORKS
A DIVISION OF DAVENPORT BESLER CORPORATION, DAVENPORT, IOWA
ESTABLISHED IN 1900

COMPLETE INFORMATION ON REQUEST

Manufacturers' Publications

Remote Mechanical Control—A manual describes a remote mechanical control system of new design. Specification and capacity charts are given for the universal shaft, steady shaft, and bevel gear assemblies, with layouts for the most effective arrangement of these units for opening or closing large valves, ventilators, and banks of windows, or for use with cranes, windlasses, winches and steering gear.—*M. L. Bayard and Co., 1923 Indiana Ave., Philadelphia 32, Pa.*

Postwar Lumber—"Lumber After the War: How Good? How Much? How Long?" by S. R. Black, vice president of the Weyerhaeuser Sales Co., St. Paul, Minn., has been published in booklet form. Mr. Black foresees the time when new growth on forest lands will exceed requirements, thus opening the way to the development of new and greater markets for wood.—*American Forest Products Industries, Inc., 1319 Eighteenth Street, N. W., Washington 6, D. C.*

Flat Slab Floors—A catalog describes and illustrates a flat slab system of floor construction, gives design and test data and lists some users.—*Smooth Ceilings System, 802 Metropolitan Life Bldg., Minneapolis 1, Minn.*

Welded Erection System—A bulletin tells of savings claimed for this system of shop fabrication and field erection.—*J. H. Williams & Co., 400 Vulcan St., Buffalo, N. Y.*

Explosives Catalog in Spanish—A Spanish language catalog lists standard explosives and blasting supplies with their principal characteristics, strength, velocity, cartridge count, etc. There are also chapters on explosives in building, mining, rock and road blasting, and ditching.—*Atlas Powder Co., Wilmington 99, Del.*

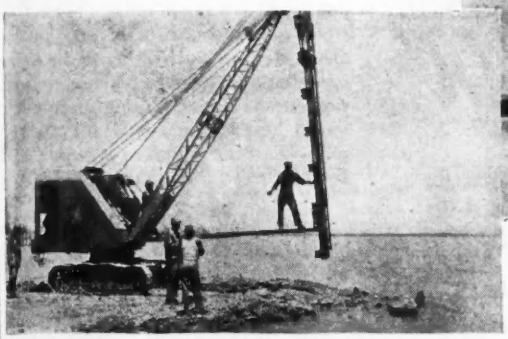
Diesel Engines—A booklet, "The Story of the Diesel," in non-technical style discusses the diesel's present fields of application, its postwar future, and advantages over other types of power. The beginning and development of the industry are also covered.—*Diesel Engine Manufacturers Association, 1 North LaSalle Street, Chicago 2, Ill.*

A Concrete Pump—A 24-page book on a pump that pumps concrete has

JACK OF ALL JOBS-

in heavy materials handling

Above—Vital supplies and equipment being unloaded by a "Fighting Osgood Mobilcrane" in the South Pacific.



Osgood "20" driving piles for a landing pier in North Africa.

Helping to clear the way to Berlin and Victory, "Fighting Osgoods" serve under fire with Army Engineers in Europe, as well as on other battle fronts.

"FIGHTING OSGOODS" LIFT, DIG AND DRIVE IN THE BATTLE OF SUPPLY

When the engineer troops and SeaBees "go in" on the heels of our attacking forces, they need the right equipment to do a multitude of jobs quickly and efficiently. Roads and air fields must be leveled, loading docks built, supplies loaded and unloaded, rubble cleared away fast.

Osgood shovels and cranes figure dependably in all these operations . . . working as crane, pile driver and shovel. They're engineered with the power, stamina and versatility to keep precision planning and production on schedule. You'll appreciate these advantages when *your* planning goes into action after Victory.

WHEN IT'S WAR BONDS, BUY MORE THAN BEFORE!

THE GENERAL EXCAVATOR COMPANY
CRANES, DRAGLINES AND SHOVELS
DIESEL, GAS, ELECTRIC

Associated with The General Excavator Company

OSGOOD

CRANES-SHOVELS OSGOOD MARION OHIO U.S.A. GENERAL

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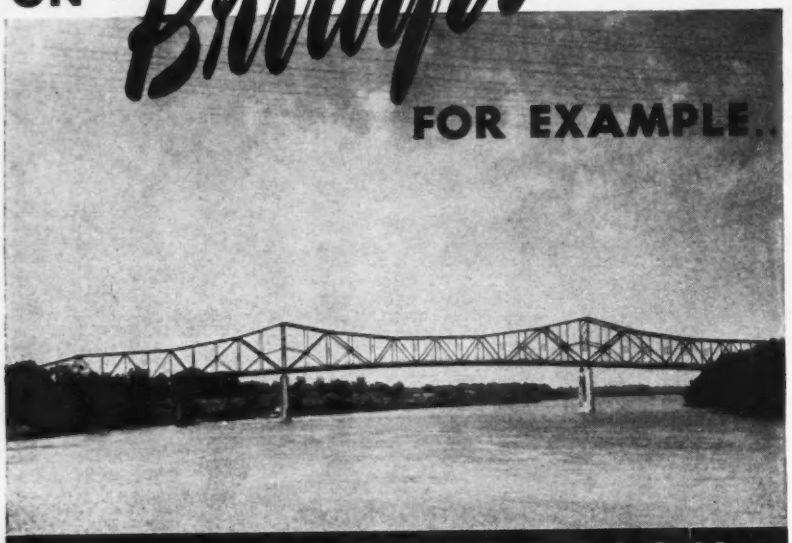
ARMY E NAVY

OSGOOD
SHOVELS, DRAGLINES
CRANES

ON *Bridges*

FOR EXAMPLE..



STEEL FABRICATION..

by Duffin

BRIDGING RIVERS, highways, railroads, are many examples of steel fabrication by Duffin. Simple beam span bridges, continuous truss spans like the one shown above, and every other type, are typical examples where this experienced fabricating service will help get the job done right . . . on time . . . smoothly. Duffin's skilled workmen, supervisors who "grew up" in the steel fabricating business, and modern, complete shop facilities are available for bridge construction, buildings, towers, lockgates, or what have you. On the next job—try Duffin. You'll be glad you did.

AISC

DUFFIN IRON COMPANY

STEEL FABRICATORS

Established 1876

Contracting Office: 37 W. Van Buren Street, Chicago 5, Ill.
Plant: 4837 So. Kedzie Ave., Chicago 32, Ill.

been published. Photographs aid in telling how it works and what its special features are. Also there are charts, graphs, specifications, and descriptive text.—*Chain Belt Co., 1600 W. Bruce St., Milwaukee 4, Wis.*

Protective Coatings—A booklet describes protective coatings for metal, brick, cement and wood surfaces. It also describes a paint for creosoted wood block floors, poles, guard rails and posts.—*Reilly Tar & Chemical Corp., Merchants Bank Bldg., Indianapolis 4, Ind.*

Road Building—An 8-page booklet pictures rock crushing, relocating, maintenance, ditch-cleaning, scraping, blind corner removal, gravel loading, windrowing, grading, ditch cutting and snow removal operations in various parts of the United States.—*Caterpillar Tractor Co., Peoria, Ill.*

Maintenance Welding—A 6-page folder on low temperature welding rods. It describes procedures in which rods, applied at low temperatures to cast iron, steel, aluminum, bronze, etc. produce clean, strong bonds yet leave the welded part easily machinable. There are many suggestions for salvaging parts which might be thought ready for the junk pile.—*Eutectic Welding Alloys Co., 40 Worth Street, New York 13, N. Y.*

Color for Industry—This paint booklet ought to help those interested in weighing the advantages of color as it may apply to their particular plant requirements.—*U. S. Gutta Percha Paint Co., Providence, R. I.*

Wire Rope Clips—An instruction booklet contains a table of the number of clips to use for all sizes of rope up to three inches, and instructions, illustrated with diagram and pictures, for properly making a wire rope fastening. —*American Hoist & Derrick Co., St. Paul 1, Minn.*

Excavation Machinery—"In War and Peace" is the title of a booklet containing dramatic photographs of dozers, scrapers, dozershovels, and other tractor equipment in action on both the war and home fronts. *Bucyrus-Erie Co., South Milwaukee, Wis.*

Rotometers—A new publication describing this company's rotometer gives specific gravities of gases and of various metals used in floats together with formulae converting water and air capacities to terms of other liquids and gases. Other selection factors, such as pressure drop, length of scale and float material are covered.—*Cochrane Corp., Philadelphia 32, Pa.*

The Construction Industry

delivery now!

Let your nearest Sullivan distributor or branch office give you complete details and show you how the advantages of Sullivan air tools can improve your bidding position on new contracts and make more profit on your present jobs. **Sullivan Machinery Company, Michigan City, Indiana. In Canada: Canadian Sullivan Machinery Company, Ltd., Dundas, Ontario.**

PRODUCTS

Portable Compressors - Stationary Compressors - Rock Drills - Wagon Drills
Core Drills - Portable Hoists - Paving Breakers - Spaders - Trench Diggers
Sheeting Drivers - Plug Drills - Tunnel Loaders

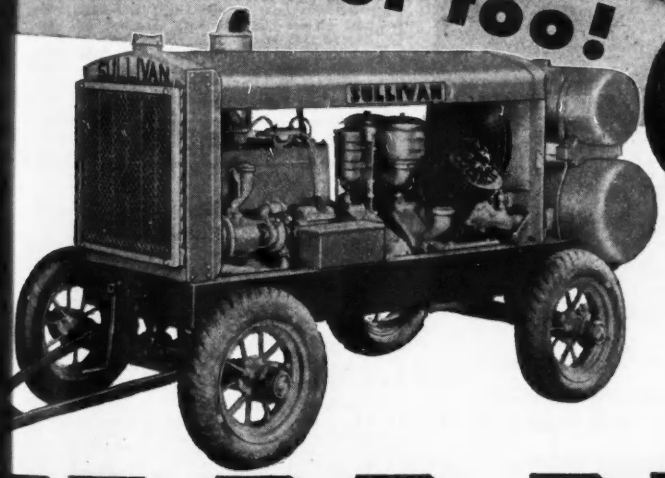
M-2 SPADER

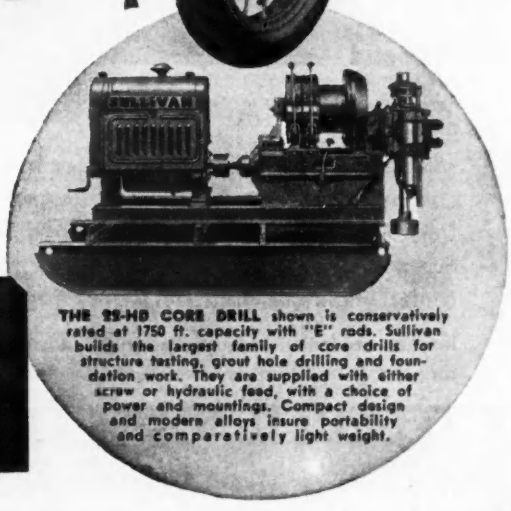
THE M-2 SPADERS AND M-2 TRENCH DIGGERS are widely used for shaft sinking, tunnel and trench work in clay, broken shale, hardpan, frozen ground, etc. They are ruggedly built to give long, trouble-free service.

THE SULLIVAN MEDIUMWEIGHT WAGON DRILL is a Universal Model that takes the tough jobs right in stride to drill more footage per shift. Brakes make moving easier and quicker, and reduce set-up time, so there's more time for actual drilling. Sturdy frame insures rigid support at all drilling positions. Hydra-lift control permits quick, easy positioning of drill and feed. Sullivan "Piston-motor" provides simple, efficient control of the feed with plenty of power for any drilling condition. The Sullivan **LIGHTWEIGHT** is a one-man wagon drill that can be operated from a 105-ft. portable. Both wagons mount drills using the well-known Sullivan "Dual-Valve".

MEDIUMWEIGHT

the power too!

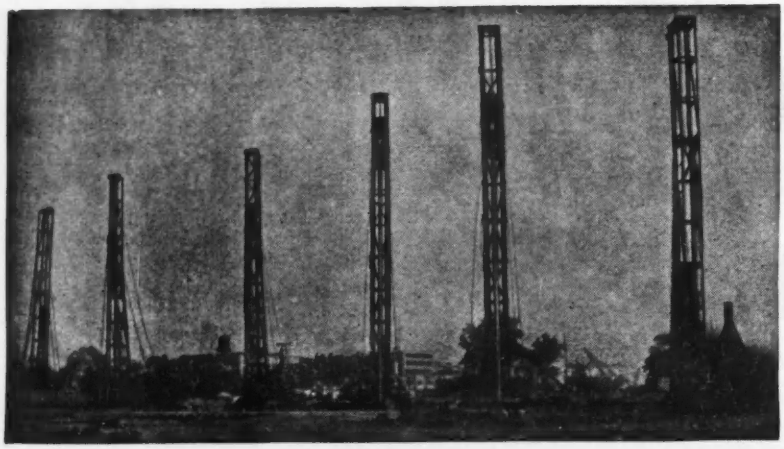




THE 22-HD CORE DRILL shown is conservatively rated at 1750 ft. capacity with "E" rods. Sullivan builds the largest family of core drills for structure testing, grout hole drilling and foundation work. They are supplied with either screw or hydraulic feed, with a choice of power and mountings. Compact design and modern alloys insure portability and comparatively light weight.

IVAN

Established 1851 •



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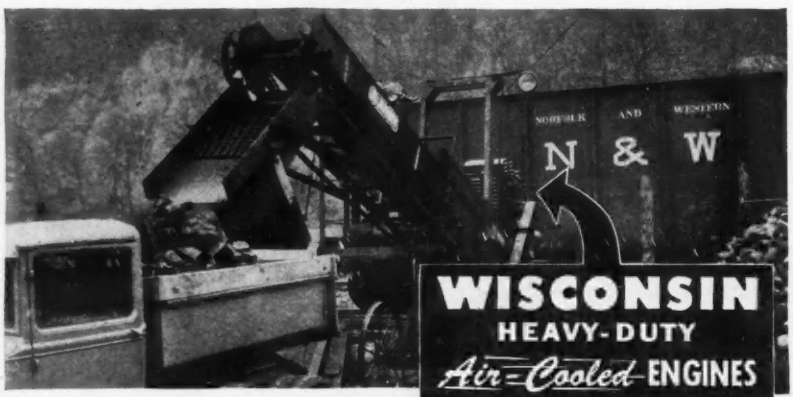
WESTERN FOUNDATION CO. DRILLED-IN CAISSON CORP.
WESTERN CONCRETE PILE CORP.
308 W. WASHINGTON ST., CHICAGO 6, ILL. 155 EAST 42ND ST., NEW YORK 17, N. Y.
MONADNOCK BLDG., SAN FRANCISCO 5, CALIF.



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HEAVY-DUTY
Air-Cooled ENGINES
on the Job

MATERIAL HANDLING

Material handling is a dirty job for both men and machines . . . but it isn't too dirty or too tough for Wisconsin Heavy-Duty Air-Cooled Engines. This Jeffrey Model 209B Portable Scraper Conveyor, powered by a Wisconsin 4-cylinder air-cooled engine, is made by Jeffrey Mfg. Co., Columbus, Ohio.

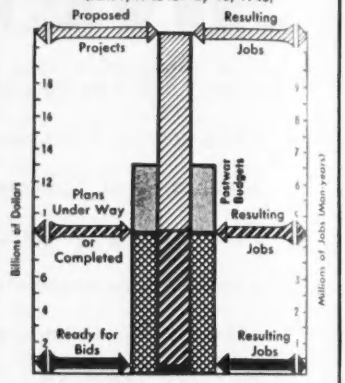
If your equipment requires rugged, dependable power within a range of 1 to 30 hp., you can't do better than to specify "Wisconsin".

WISCONSIN MOTOR Corporation
MILWAUKEE 14, WISCONSIN
World's Largest Builders of Heavy Duty Air-Cooled Engines

POSTWAR PROJECTS

POSTWAR ENGINEERING CONSTRUCTION VOLUME PROPOSED, PLANS UNDERWAY OR COMPLETED, AND READY FOR BIDS

Status of postwar planning reported to ENR compared with annual postwar construction budget based on assumed National Income of $150,000,000,000 per year.
(Jan. 1, 1943 to May 10, 1945)



(Assuming that $1 of construction volume produces 1 man-hour of labor, ½ on site)

Projects proposed for postwar construction have been published in these columns since January, 1943, as they have been reported to Engineering News-Record.

Statistics based on these reports are used by the Committee on Postwar Construction of the American Society of Civil Engineers to measure the progress of plans for postwar projects.

The chart above shows, both in estimated dollar volume and in jobs or man-years of labor, how fast this reservoir of future work is filling up.

If you or your community are working on projects that have not yet been included in this "postwar reservoir," please send us an itemized list and description of them, including estimated cost and the names of the engineers who are at work on the plans. Then as you watch the arrows climb you will know that you and your community are contributing to the success of the NUMBER ONE JOB of preparing for peace.

Address your projects list to Manager Business News Department, Engineering News-Record, 330 W. 42nd St., New York 18, N. Y.

MINIMUM SIZE OF PROJECTS PUBLISHED

Public Works	$25,000
Industrial Buildings	40,000
All Other Buildings	150,000

WATER SUPPLY

PROPOSED WORK

N. Y., Esperance—Village, water supply sys. **$25,000.** State Aid Planning Funds allotted.

N. Y., Irvington—Village, imprv. water sys **$145,000.** State Aid Planning Funds allotted.

N. Y., Minerva—Town, exten. water pipelines from town of Minerva to Hamlet of Olmstedville, **$55,000.** State Aid Planning Funds allotted.

N. Y., Monticello—Village, water sys. imprvs. **$85,000.** State Aid Planning Funds allotted.

Ont., Wyoming—Municipality, c/o E. M. Davis, Wyoming, WW sys. **$50,000.**

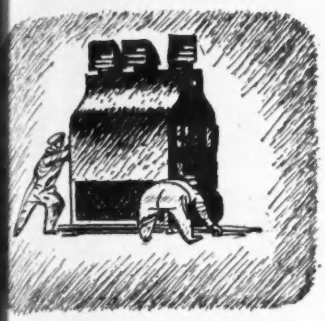
PLANS UNDER WAY

La., Abita Springs—Town, plans under way combined water and natural gas distr. sys. incl. pipeline, mains, distr. pipelines, regulating stations, meters and regulators, pumps and machinery, etc. **$65,000.** Bond election planned. Barnard & Burk, Triad Bldg., Baton Rouge, consult. engrs.

Mass., Andover—Town, C. T. Gilliard, supt. Bd. P. Wks., Town Hall, plans under way 2 mi. 12 in. watermain in Haggetts Pond Rd. To exceed **$40,000.** Weston & Sampson, 14 Beacon St., Boston, consult. engrs.

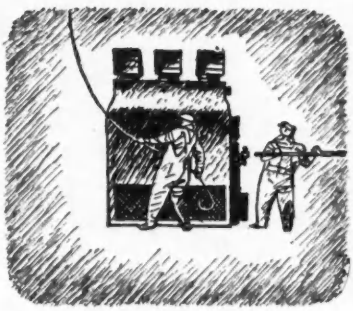
★**O., Elyria**—City, surveys completed water distr. sys., consisting 16 in. main from storage tank at Belmont to Broad Sts. at East Ave.; 12 in. line from Courtland and Lake Ave. to proposed 500,000 gal. storage tank; two 12 in. and one 6 in. line and looping of numerous dead end mains. **$531,600.** Financing not provided. Havens & Emerson, Leader Bldg., Cleveland, consult. engrs. J. M. Powell, Municipal Bldg., city engr. CD 12/27/43—ENR 1/13/44.

a heating system should:



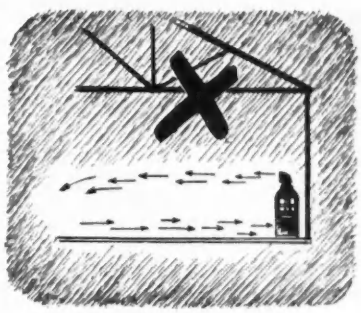
e easy to install

ravo direct fired warm air heaters are ipped from the factory with the re-actory lining in place, the unit com-ete—ready to produce heat. Installa-on is a clean job, quickly accomplished.



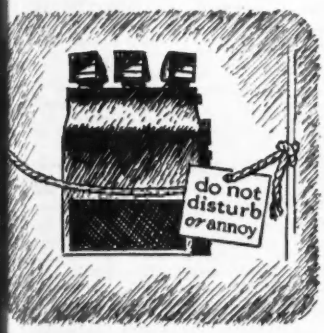
easy to connect

Where either gas or oil is the fuel to be used the heaters require only to be connected with the fuel pipe and to the power line. Heat can be on tap just a few hours after the heater is moved in.



heat directionally

Top discharge—bottom intake tends to arrest the normal upward flow of warm air, keep the heat in the working area, where it belongs, and not in the roof trusses.

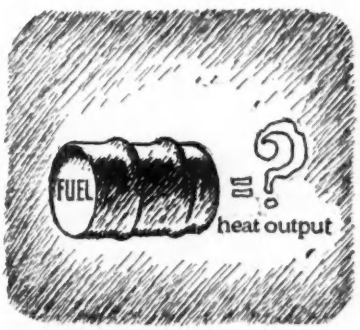


e self sufficient

as or oil fired models are practically utomatic, require no regular main-enance. Once the ignition button is ressed thermostatic controls do the rest. ny employee can regulate.

give pleasant heat

Dravo direct fired warm air heaters are easy to regulate for volume and direction so that workmen can enjoy clean, comfortable heat and even temperature throughout the season.

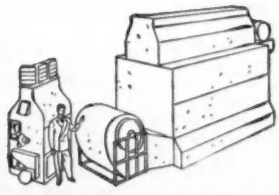


be +80% efficient

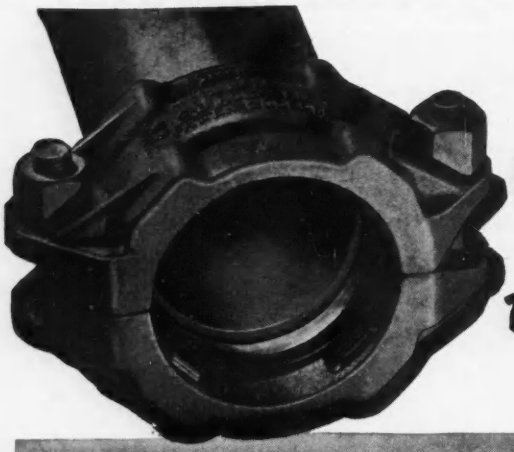
Conditions vary with each building but Dravo direct fired heaters for gas or oil have constantly shown between 80-85% efficiency in test results—more BTUs from the same amount of fuel.

The advantages pictured above are inherent to direct fired warm air heating and are available for any building where this type of heat is applicable. They can function as independent portable units; they can be installed in out-of-the way plant areas to provide supplementary heat; they can be hung from the walls when floor space is not available; they can be moved from place to place during building construction and be retained as permanent heating systems afterward. Air cooling and cleaning can be arranged in conjunction with them. Will this method fit any building you have to heat? Our Building Survey Report will help organize the data we need to suggest a layout and quote a price. Write for a copy—address Dravo Corporation, Heater Department, 300 Penn Avenue, Pittsburgh 22, Pa.

DRAVO
HEATING



300,000 TO 4,000,000 B.T.U. CAPACITY PLUS UNITS COMBINE FOR ANY DESIRED OUTPUT



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ROLAGRIP PIPE COUPLINGS

With PLAIN END Pipe for Leakproof Connections

With Rolagrips no part of the pipe is cut away by threading or grooving, leaving the machined surface exposed to corrosion. There is no danger of excessive weakening of the pipe wall from grooving. In fact, since no end preparation is required with Rolagrip Couplings, lighter weight pipe may be used at considerable savings in initial cost, freight, handling, maintenance.

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Only three parts to position, two bolts to tighten for leakproof connections. Odd lengths of pipe may be cut and coupled-in; a section of damaged pipe may be cut out and new section inserted and coupled with Rolagrips. In addition, both coupling and pipe may be completely salvaged. Send for new Catalog showing installations, engineering data and complete information on pipe couplings and fittings.

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POSTWAR PROJECTS (Cont'd.)

★**O., Hamilton**—City, C. N. Taft, dir. P. Wks., City Hall, plans under way mu nicipal WW addns., incl. installing fil **$106,388**; clarifiers, **$62,810**; outside drains f tanks, **$5,230**; outside process pipin **$23,80** converting fluctuators to dry well operation **$3,250**; converting clarifiers to hydrotreaters **$23,365**; installing carbonation tanks **$15,40** and miscellaneous work. Land rights ne cleared. A. LeFeber, Temple Dear Bldg. Cincinnati, consult. engr. A. A. Smalley, Cit Hall, city engr. CD 3/6/44—ENR 3/23/44.

O., Van Wert—City, new water supply an water treatment plant, **$470,000.** Fankhaene Pettis & Strout, 1015 Home Bank Bldg. Toledo, consult. engrs.

Tex., Highland Park (mail Dallas)—City 4700 Drexel Dr., Highland Park, Dalla Zone 5, plans 25% completed WW improv **$80,000.** R. Thomas, 4700 Drexel Dr., consult engr. CD 9/28—ENR 9/5.

Tex., League City—League City Improv Dist., League City, plans 25% completed imprvs., addns. to reservoir plant, 2½ m mains, etc. **$75,000.** Financing provided Haile & McClendon, 2807 San Jacinto St. Houston, consult. engrs.

Wash., Seattle—City, County-City Bldg. 3 and James Sts., Zone 4, 500,000 gal. elevated tower on Myrtle St., **$25,000**; 1 m. g. elevated tank at Maple Leaf reservoir, **$50,000**; 1 m. g. elevated tank on Magnolia Bluff, first unit of 50 m. g. reservoir north of Hall Lake, **$100,000**; exten. 42 in. watermain in N. and W. 80 St. C. L. Wartelle, County-City Bldg., city engr. CD 12/30/43—ENR 1/13/44.

Wash., Vancouver—Clark Co. Public Utility Dist., Vancouver, plans under way water sys. serving 600 customers in Orchards, Felida, Burton, Home and Salmon Creek Tex plats. **$150,000.** Financing not provided H. L. Gray, Henry Bldg., 4 and Union St. Seattle, Zone 1, consult. engr.

ADVANCED TO ACTIVE STATUS

Tex., Pasadena—City, City Hall, project cancelled, water sys. imprvs. **$60,000.** Work now going ahead. Garrett Eng. Co., 1510 Milam St., Houston, consult. engrs. CD 1/25— ENR 2/8.

SEWERS, WASTE DISPOSAL

PROPOSED WORK

★**Ind., Terre Haute**—City, V. J. McMillan mayor, sewage disposal plant. **$2,500,000.**

N. Y., Binghamton—City, garbage disposal plant, **$150,000.** State Aid Planning Funds allotted.

★**N. Y., Cheektowoga**—Town, storm sewers and drainage, **$1,000,000**; incinerator and garage, **$150,000.** State Aid Planning Funds allotted.

N. Y., De Witt—Town, sanitary sewerage sys. **$90,000.** State Aid Planning Funds allotted.

N. Y., Greenwich—Village, sewerage sys. and treatment plant. **$202,000.** State Aid Planning Funds allotted.

N. Y., Harrison—Town, intercepting trunk line sewer, Sewer Dist. 1. **$145,000.** State Aid Planning Funds allotted.

N. Y., Irvington—Village, imprv. sewage treatment plant. **$100,000.** State Aid Planning Funds allotted.

N. Y., Massena—Village, sewage treatment plant, **$155,000.** State Aid Planning Funds allotted.

N. Y., Monticello—Village, remodeling sewage treatment plant, **$150,000.** State Aid Planning Funds allotted.

N. Y., Moravia—Village, sanitary sys. and treatment plant, **$150,000.** State Aid Planning Funds allotted.

N. Y., Mount Morris—Village, sewage treatment plant reconstruction, **$82,000.** State Aid Planning Funds allotted.

N. Y., Newfane—Town, sewerage sys. and treatment plant, **$114,000.** State Aid Planning Funds allotted.

★**N. Y., Poughkeepsie**—Town, sanitary sewerage sys. **$652,000.** State Aid Planning Funds allotted.

N. Y., Rochester—City, City Hall, sewers, Hillside Ave. from No. 1 School to Cobbs Hill Dr., **$9,800**; Bengal Terrace from Hillside Ave., **$11,000**; Barrington St. from Harvard St. to Canterbury Rd., **$14,900**; Nunda Blvd. from Whiton Road to Cobbs Hill Dr., **$55,300.** State Aid Planning Funds allotted.

★**N. Y., Rochester**—City, City Hall, Genesee Valley Relief Tunnel, **$335,000**; sewers East Side Relief Tunnel, **$590,000**; North Goodman St. and Webster Ave. Tunnel connections, **$18,000**; Main St., East Tunnel, **$210,000**; East Ave. and Gould St. sanitary sewer, **$22,000.** State Aid Planning Funds allotted.

N. Y., Waterville—Village, sanitary sewer treatment plant, **$175,000.** State Aid Planning Funds allotted.

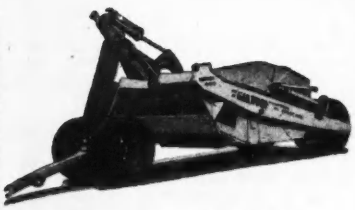
Tex., Pleasant Grove (R. Sta. Dallas)—Dallas Co. Water Control & Imprvt. Dist. c/o J. Simms, 9-22 N. Buckner St., Dallas, bond election June 12, sewage disposal plant, **$70,000**; sewerage sys., **$130,000.** CD 3/30— ENR 4/19.

GAR WOOD ROAD MACHINERY

STAYS ON THE JOB

GAR WOOD ROAD MACHINERY TRADE MARK

CABLE DOZECASTERS with angling blade for Allis-Chalmers HD-10 and HD-14 Tractors



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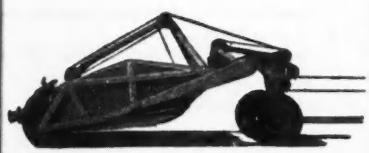
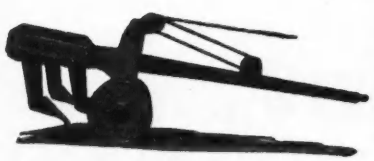
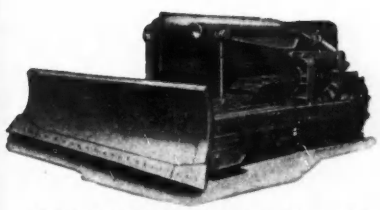


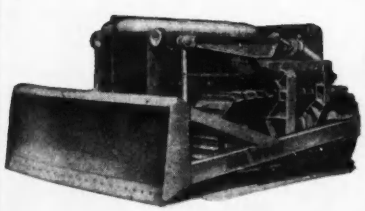
4-WHEEL CABLE SCRAPERS
Capacities: 11-15-20-25 cu. yds.



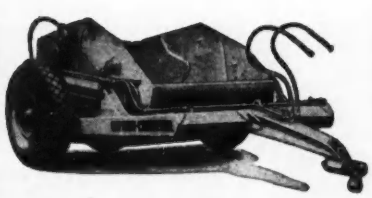
HEAVY DUTY RIPPERS
Cable and hydraulic operation



HYDRAULIC ROADBUILDERS with angling blade. For all Allis-Chalmers Tractors



HYDRAULIC BULLDOZERS with fixed blade. For all Allis-Chalmers Tractors



2-WHEEL HYDRAULIC SCRAPERS
Capacities: 3-5-6-8 cu. yds.

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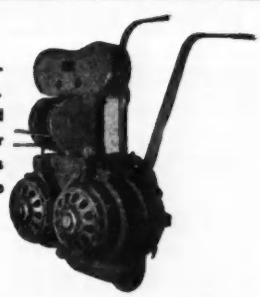

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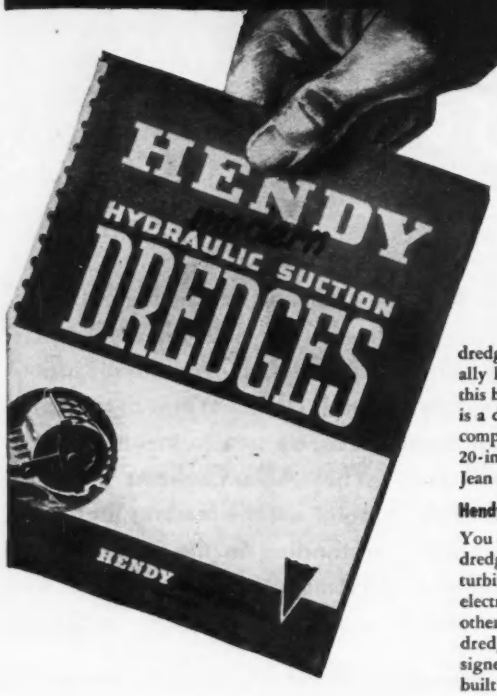

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POSTWAR PROJECTS (Cont'd.)

Alta., Calgary—Municipality, Incinerator, $350,000.

Ont., Sturgeon—Municipality, A. P. Allaire, clk., Sturgeon Falls, sewers. $45,000.

PLANS UNDER WAY

La., Monroe—City, City Hall, sewage collection and disposal sys. Barnard & Burk, 314 Triad Bldg., Baton Rouge, consult. engrs.

Mass., Gardner—Dpt. P. Wks., City Hall, plans under way sewage treatment plant, West Bway. $275,000. Financing not provided. E. J. Teir, City Hall, city engr. CD 10/23—ENR 11/2.

Mass., Ludlow—Town, P. R. Baird, engr., 182 North St., plans under way 2 sewer projects. $65,000.

Mich., Pontiac—City, City Hall, plans by Jones & Henry, Toledo Trust Bldg., Toledo, O., sewage treatment plant addns. $75,000.

N. J., Hillside—Town, plans under way imprv. sewerage sys. and roads. $175,000. Financing provided. H. Kreh, Jr., 433 N. Broad St., Elizabeth, consult. engr.

N. D., Grand Forks—City, H. A. Bostrom, mayor, City Hall, storm sewerage sys. $120,000. A. F. Hulteng, City Hall, city engr. CD 6/1/43—ENR 6/3/43.

★**O., Marion**—City, Municipal Bldg., plans under way sewers, $406,450; imprv., modernizing sewage treatment plant, $290,000. Financing not provided. T. Cathers, Municipal Bldg., city engr.

Okla., Pauls Valley—City, H. Hart, mayor, City Hall, plans 5% completed addnl. storm sewers, $30,000. Land rights not cleared, financing not provided. P. A. Little, Chickasha, city engr.

Ore., Albany—City, City Hall, plans under way 2 trunk sewers. $45,000. Financing provided. W. Larsen, Court House, consult. engr.

★**Pa., Harrisburg**—City, J. A. Vogler, dir. Streets & Pub. Imprvts., sedimentation type sewage plant, 2 pump. stations, $1,760,000. Financing not provided. Gannett Fleming, Corddry & Carpenter, Inc., 600 N. 2 St., Harrisburg, consult. engrs. R. M. Andrews and C. E. Peter, City Hall, city engrs. CD 6/16—ENR 6/29.

Sask., Swift Current—Municipality, sewage disposal plant, $45,000. V. E. Thierman, City Hall, engr.

READY FOR BIDS

Mich., Tecumseh—City, plans completed sewage treatment plant, $160,000. Finkbeiner Pettis & Strout, 1015 Home Bank Bldg., Toledo, O., consult. engrs. CD 8/23—ENR 9/7.

Tex., Crane—Town, plans completed sanitary sewers. $60,000. Financing provided. Koch & Fowler, Great National Life Bldg., Dallas, consult. engrs. CD—4/19—ENR 5/3.

BRIDGES

PROPOSED WORK

Alta., Calgary — Municipality, Elbow Bridge. $175,000.

PLANS UNDER WAY

Conn., Bridgeport—City, Dpt. P. Wks., P. Brewster, dir., bridge, Seaside Park to Burr Creek Bulkhead, construct bulkhead. Over $25,000. Financing not provided. H. Rowland, City Hall, engr.

★**Ill., Chicago**—Cook Co. Hy. Dpt., G. Quinlan, supt., 160 N. LaSalle St., overpass 71 St. and Jeffrey Ave. at I.C. elimination of grade crossing at heavily-traveled thoroughfare, $2,090,000; underpass in W. 87 St. near Damen under Penn R.R. and B. & O.O.C.T. constructing underpass and eliminate grade crossing, $480,000; underpass in W. 79 St. near S. Central Park, $190,000; underpass in W. 31 St. between S. Cicero Ave. and S. Kostner St. paving, opening W. 31 St., $300,000; grade separation S. Central Ave. near Harrison St. under railroad, $430,000. Financing not provided. D. Campbell, 160 N. LaSalle St., ch. engr.

★**Ill., Chicago**—Cook Co. Hy. Dpt., 160 N. LaSalle St., G. Quinlan, supt., underpass in N. Western Ave. and Logan Blvd., under C. & N. W. R. R., reconstruct with 180 ft. through truss, $750,000; viaduct over Cicero Ave. near Dickens Ave. over C. M. St. P. & P. Ry., eliminate grade crossing, $530,000; underpass and elimination of grade crossing in N. Pulaski Rd. near 52 St. under I. H. B. R. R., $340,000; in W. 111 St. near S. Rockwell St. under B. & O. C. T. R. R., $210,000. Financing not provided. D. Campbell, 160 N. LaSalle St., ch. engr.

★**Ill., Chicago**—Cook Co. Hwy. Dpt., G. Quinlan, supt., 160 N. LaSalle St., underpass in N. Pulaski Rd. at W. Belder under C. M. & St. P. & P. R.R. reconstruction, eliminating sharp turns and widening roadway, $600,000; underpass at Devon Ave. near Central Ave., eliminating grade crossing railroad tracks, $230,000. Financing not provided. D. Campbell, ch. engr.

O., Canton—City, City Hall, bridge over West Creek at 6 St. S.W. $60,694. Financing not provided. J. Shisler, Municipal Bldg., city engr.

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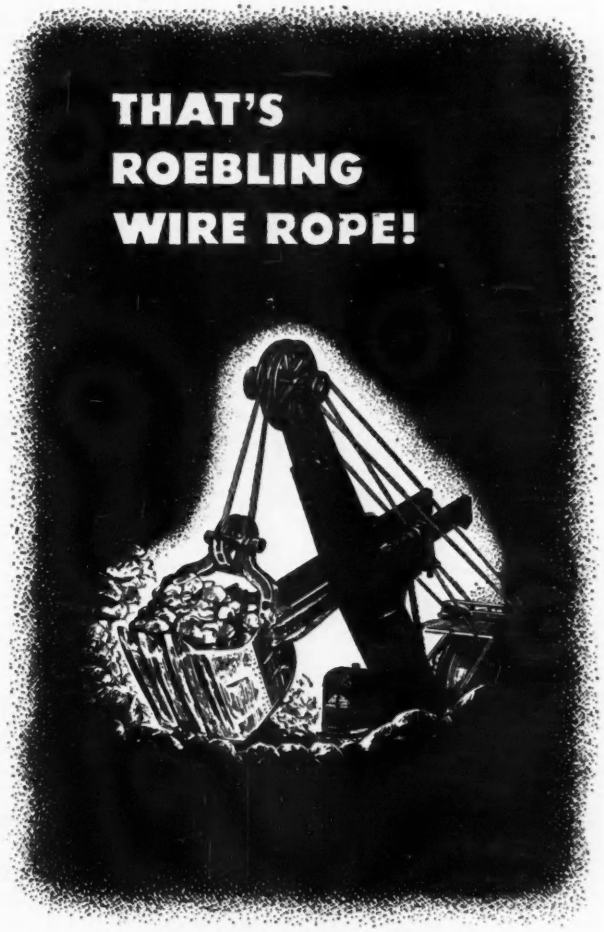

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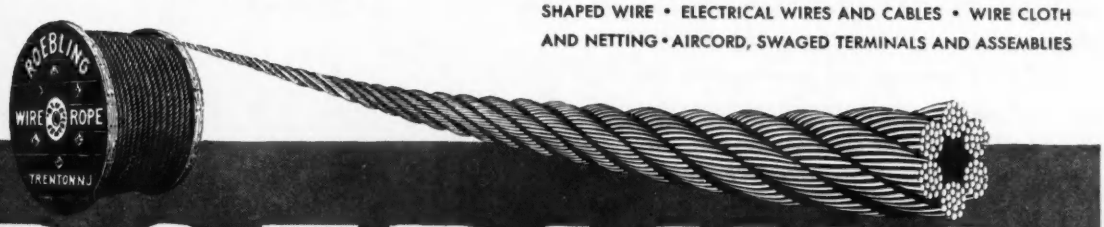

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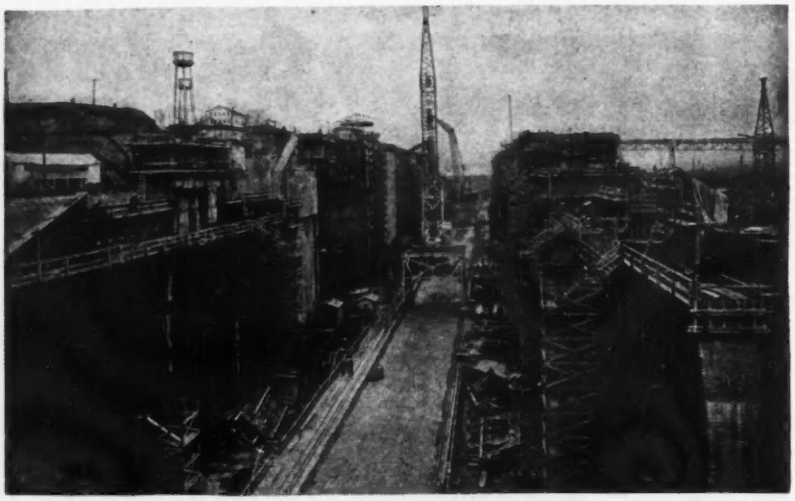

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POSTWAR PROJECTS (Cont'd.)

Okla., Tulsa—Tulsa Co., Court House, bridges. Bird Creek-Shell Creek, $200,000. Land rights not cleared, financing not provided. G. O. Straughan, co. engr.

Ore. Medford—Jackson Co., Court House, plans under way 6 large bridges, $200,000; 70 small bridges, $150,000. Financing partially available. P. B. Rynning, County Court, co. engr. CD 6/19—ENR 6/29.

R. I. Tiverton—State of Rhode Island and Providence Plantations, Div. Roads & Bridges, State House, Providence, surveys and plans started, concrete, steel bridge replacing old stone bridge, $150,000. Financing provided.

READY FOR BIDS

Pa., Washington—Bd. Comrs. Washington Co., Washington, plans completed Noble Bridge, Sawhill Bridge, Greer Station Bridge, Wylandville Bridge, Van Eman Bridge, Mc-Connells Mill Bridge, Hough Bridge, Gabby Bridge, Johnson Bridge, Lawton Bridge, McCullogh Bridge, Hanover Twp. Bridge, Kings Creek Bridge, Scott Bridge, Gist Bridge, Henry Bridge, Majoris Bridge, Hartman Bridge, Coal Center Bridge, Burgettstown Bridge, Witherspoon Bridge, Hanover Bridge, Robinson Bridge, McLaren Bridge, Raccoon Creek Bridge, Hawkins Bridge, Davis Bridge, Evans Bridge, Cross Roads Bridge, Day Bridge, Two Mile Run Bridge, Wylie Bridge, Danley Bridge, $310,000; repairing 25 additional bridges, $50,000. Financing available.

Wis., Milwaukee—City, plans completed W. Adler St. Bridge, 30 ft. span, 46 ft. roadway, 2 sidewalks, $25,000; N. 45 St. Bridge, 60 ft. span, 30 ft. roadway, 1 sidewalk, rein.-con., steel, $30,000. J. J. Schwada, city engr. CD 12/3/43—ENR 12/9/43.

STREETS AND ROADS

PROPOSED WORK

New York—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, access road in Jamesville Baird State Park, Dutchess Co., for Taconic State Park Comn., Dpt., Conservations, Broadway Arcade Bldg., Albany, Zone 7, $35,000.

N. Y., Rochester—City, City Hall, pavement Werner Park, Monroe Ave. to Hillside, $34,000; Linden St., South to Mt. Hope Ave., $34,000; Reynolds St., Bronson Ave. to Main St. west, $44,000; Clinton Ave., North from Ridge Rd. to city line, $36,500; Adams St. from Plymouth Ave. south, $26,500. State Aid Planning Funds allotted.

Ont., Toronto—City, Ald. H. W. Timminior, chn., modify curvature of Lakeshore Blvd. between Dunn Ave. and Jameson Ave., $203,000.

PLANS UNDER WAY

★**Ill., Chicago** — City, Dpt. Subways & Superhighways, P. Harrington, comr., 20 N. Wacker Dr., preliminary plans 90% completed West Expressway 8 mi. new 8-lane access highway with ramps, bridges, drainage, landscaping Congress St. from Field Dr. to Austin Blvd., $40,800,000 ($16,000,000 available), total mileage and cost incl. portions to be built by other agencies not incl. Cook Co. portion of $4,800,000; designs and sketches 20% completed Southwest Expressways, 5.5 mi. 8-lane divided roadway, limited access with ramp and bridges along I & M Canal from Southwest Expressway at 26 St. to Kedzie, $21,600,000, total mileage and cost incl. portions to be built by other agencies; 10% completed Wacker Dr., 0.6 mi. new double deck structure between West Expressway interchange and present Wacker Dr. imprvs., near Lake St., with connections, $10,000,000; designs section 1.25% completed South Expressway 5.8 mi. new 8-lane divided roadway, limited access with ramps and bridges from Congress St. and Union Ave. to 55 and Wallace Sts., $29,300,000. Financing not provided. P. F. Girard, 20 N. Wacker Dr., project engr.

Mass., Ludlow—Town, P. R. Baird, engr., 182 North St., plans under way 4 highway projects, $250,000.

★**Missouri**—State Hy. Dpt., Jefferson City, plans 90% completed graded earth, surfacing 6.133 mi. road from Route 66 to St. Clair North to Route 50, Route AA, Franklin Co., $103,000; 3.7 mi. road from present construction south to Dent Co., Route M, Crawford Co., $59,600; 10.796 mi. Route N, from Route 63 southwest to Argyle Route D, Osage Co., $110,000; 4.089 mi. road from Route J northeast to Gasconada Co., Osage Co., $25,000; 5.113 mi. Route EE, from Route E, east to Route C, $47,000; 7.753 mi. Route E, road from Route 52 northeast to Montesano Co., $33,800, both Morgan Co.; 7.004 mi. Route B from Route 19 to Montgomery City, west to Callaway Co., $69,000; 5 mi. Route E from Bellflower to Gamma, $45,000, both Montgomery Co.; 12.061 mi. Route C, road from Morgan Co.; east to High Point to Cole Co., $76,000; 4.167 mi. road from St. Elizabeth Northeast to present construction, Montieau Co., Route B $73,000; 7.855 mi. road from Route C at Brumley east to present construction Route D, $92,600, both Miller Co.; 7 mi. Route E, from Route 28 east to Stockney, $48,000; 2.953 mi. Route H, from Route F south to High Gate, $25,000; 2.249 mi. Route F, from Route 28 east to Route H, $28,000, all foregoing Maries Co.; 3 mi. Route A, from present construction C north to Randolph Co., $33,000; 8.635 mi. Route V

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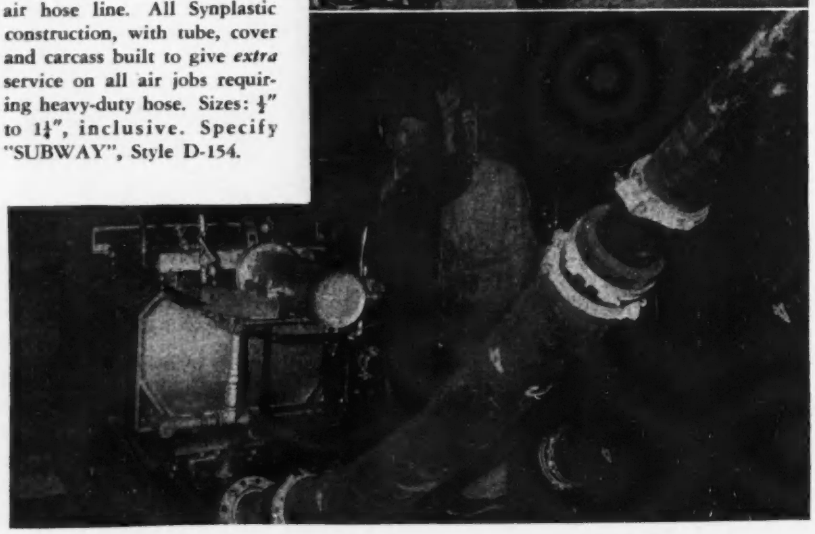

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POSTWAR PROJECTS (Cont'd.)

Route 3 of Armstrong west to Charlton Co., **$66,000,** both Howard Co.; 9.045 mi. Route D, from south of Boonville south to Route J, **$60,400;** 5.2 mi. Route C, near Lebanon southwest to Route 50, **$31,000;** 4.734 mi. Route F, from Route 95 near Overton south east to Woolridge, **$34,000,** all foregoing Cooper Co.; Route M, from Route E at Wardsville northeast to Route 50, Cole Co., **$50,000;** 6.309 mi. Route D, from Benton Co. east to Barnumton, **$50,000;** 13.91 mi. Route A, from Tocanto east and south to Pulaski Co. near Richland, **$75,000,** both Camden Co.; 1.934 mi. Route D, from present construction east to Steedman east to Portland, **$50,000;** 6.174 mi. Route E, from Route M east to Route 54, near Aux Vasse, **$40,000;** 3.028 mi. Route B, from Sharock to Montgomery Co., **$36,000,** all foregoing Callaway Co.; 5 mi. Route E, from northwest of Columbia Northwest to Wilhites Store, **$70,000;** 8 mi. Route O from Huntsdale northwest to Route 40 & F, **$53,000;** 5.009 mi. Route F, from Rucker east to Route 72, **$37,000,** all foregoing Boone Co.; 4.6 mi. Route E, from Route 41 south to Nipton, **$38,800;** 9 mi. Route EE, from Route 40 north to Route A (20), **$49,500;** 8.5 mi. Route BB from Route A to Blackburn to Route 65 of Grand Pass, **$67,000;** 4 mi. Route P, from Route D east to Saline City, **$26,400;** 7.047 mi. Route D, from Route 24 South to Route 41 to Hardeman, **$35,000,** all foregoing Saline Co.; 7.157 mi. road from Howland north and east to Iowa line, Putnam Co., **$57,000;** 3.336 mi. Route W, road from Nodaway Co. east to Oxford, Worth Co., **$48,000;** 8.844 mi. Route B, from Route 13 east and north, **$88,100;** 4.173 mi. Route C, from Rayville northwest to present contsruction, **$45,700,** both Ray Co.; 9 mi. Route N, from Route 45 northwest to Platte City, **$61,300;** 3.996 mi. Route J, from Tracy northwest to Route 45, **$52,000,** both Platte Co.; 9.265 mi. Route B from Greenridge northeast towards Sedalia, **$54,600;** 4.409 mi. Route C, southeast of Sedalia, **$40,300,** both Pettis Co.; 9.62 mi. Route FF, from Route O east to Route 13, **$57,600;** 7.61 mi. Route FF from Jackson Co. east to Route C, **$47,600;** 7.7 mi. Route E, from Mowies north to Route 13, **$41,500;** 5.051 mi. Route M, from Route 40 south to Johnson Co., **$42,400,** all foregoing Lafayette Co.; 7.8 mi. Route C, from Route 15 south to Route C(2), **$45,100;** 4 mi. Route B, from Route C to Henry Co., **$35,500;** 3 mi. Route E, from Valley City to Route J, **$25,500;** 3.94 mi. Route M, from Columbus, north to Lafayette Co., **$26,000;** 6.037 mi. Route D, from present construction south to Henry Co., **$35,300,** all foregoing Johnson Co.; 6.051 mi. Route W from Route A south to Gaines, **$30,300;** 5.134 mi. Route C from Route A northeast to Roseland, **$58,800,** both Henry Co. C. W. Brown, Jefferson City, ch. engr.

New Hampshire—State Hy. Dpt., Concord, plans completed 4½ mi. road mix highway, Hillsboro-Henniker, Hillsboro and Merrimack Counties. **$400,000.** Land rights not cleared. J. O. Morton, Concord, constr. engr. CD 8/11—ENR 9/7.

★**Okla., Tulsa**—Tulsa Co., Court House, highway construction, **$1,000,000.** Land rights not cleared, financing not provided. G. O. Straughan, co. engr.

★**Oregon**—State Hy. Comn., Salem, plans under way imprv. Columbia and Old Oregon Trail Hy., **$3,192,000;** Pacific Hy. **$5,884,000;** Oregon Coast Hy., **$3,554,000;** The Dalles-California Hy., Wasco, Deschutes, Jefferson and Klamath Counties, **$2,233,000;** widening, straightening South Santiam Hy. Foster to Canyon Creek, Linn Co., **$200,000.** Financing provided. R. H. Baldock, Salem, state hy. engr. CD 3/4/43—ENR 3/18/43.

★**Ore., Medford**—Jackson Co., Court House, plans under way grading 52 mi. **$1,000,000;** rock resurfacing 86 mi., **$750,000;** oiling 85 mi. **$400,000;** maintenance, **$500,000.** Financing partially available. P. B. Rynning, Court House, co. engr. CD 6/19—ENR 7/13.

R. I., Narragansett—State of Rhode Island and Providence Plantations, Div. Roads & Bridges, State House, Providence, plans and surveys started paving Gallilee Rd. **$145,000.** Financing provided.

★**Tex., Dallas**—Dallas Co., A. Templeton, judge, Courthouse, plans 10% completed 196.6 mi. farm-to-market roads. **$2,000,000.** Financing provided. R. H. Chuger, Court House, engr. CD 5/2.

Tex., Richmond—City, City Hall, plans 50% completed asphalt retopping, paving streets, **$80,000.** Financing provided. Halff & McClendon, 2807 San Jacinto St., Houston, consult. engrs.

Vt., Rutland—City, Dpt. P. Wks., City Hall, concrete paved roads. **$75,000.** Financing provided. W. V. Kallio, City Hall, city engr.

Wash., Tacoma—City, A. R. Bergersen, P. Wks. Comr., City Hall, plans completed bituminous surfacing and seal coating graded streets in northwest section of city's residential district, **$90,000.** Legal obstacles to be overcome, financing provided. H. Hantz, City Hall, city engr.

Alaska, Ketchikan—City, City Hall, paving road from Stedman St. bridge to Coast Guard base, **$72,000.** Financing not provided. C. Howard, City Hall, city engr.

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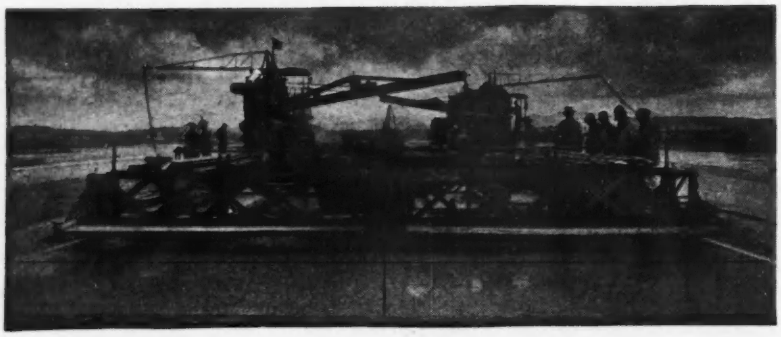

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POSTWAR PROJECTS (Cont'd.)

EARTHWORK, • WATERWAYS

PLANS UNDER WAY

Mass., Leominster—City, Mayor LaPierre, City Hall, plans under way rebuilding dam at Smith's Pond. To exceed $25,000. Wm. P. Wray, City Hall, city engr.

★ **†Oklahoma** — U. S. Eng., 416 Wright Bldg., Tulsa, plans 5% completed flood control dam and reservoir on South Canadian River, at Bridgeport, Caddo Co., over $500,000; flood control dam and reservoir on South Canadian River at Mustang, Canadian Co., over $500,000. Financing not provided.

Okla., Hennessey—City, City Hall, F. Cordry, mayor, flood control dam casting for overflow from Turkey Creek, $25,000. Land rights not cleared, legal obstacles to be overcome, financing not provided. C. R. Steele, Kingfisher, engr.

★ **Texas** — Brazos River Conservation & Reclamation Dist., Mineral Wells and G. Chance, pres., Bryan, plans 25% completed, flood control dam on Lampasas River, southwest, Belton, $6,000,000; on Leon River, Temple, $7,000,000; flood control and hydroelectric power dam at DeCordova Bend on Brazos River, at Granbury, west of Cleburne, over $4,000,000. Financing provided. Amburssen Engr. Corp., 295 Madison Ave., New York, N. Y., consult. engrs. CD 3/16—ENR 9/7.

LATIN AMERICA

Brazil—Cia. Hydro Electrica National de Sao Francisco, c/o Brazilian Dpt. Agriculture, Dr. Apolonio de Sales, dir., Rio de Janeiro, plans hydro electric project at Paulo Afonso Falls on Sao Francisco River, incl. transmission lines. $20,000,000. CD 1/5—ENR 1/25.

PUBLIC BUILDINGS

PROPOSED WORK

★ **Calif., Montebello**—Montebello Bd. Educ., 1600 W. Whittier Blvd., voted bonds, addnl school bldgs., incl. Senior High School, $2,250,000. CD 4/5—ENR 4/19.

Conn., Middletown—City Mayor's Office, Middletown, brick, steel municipal office bldg. $175,000. Financing not provided.

★ **Conn., Middletown**—State Hospital, Dr. Edgar C. Yerbury, supt. imprvs., addns., alterations Mental Diseases State Hospital, $3,000,000. Financing not provided.

★ **Conn., Torrington**—Bd. Educ., Torrington, brick, steel school, $150,000; brick, steel high school, Church St., $500,000. Financing not provided.

Ill., Louisville—Clay Co., c/o Bd. Supervs., Court House, $150,000 bond election June 5, hospital.

Ind., Marion—City, City Hall, civic bldg, $150,000.

Ky., Frankfort—State Welfare Advisory Bd., State Office Bldg., J. B. Everett, chn., Frankfort, dormitory at State Feeble-Minded Institute, E. Main St. $250,000.

★ **La., Alexandria**—Dpt. State Institutions, R. L. Pettit, dir., Baton Rouge, imprvs. at State Colony and Training School. $600,000.

La., Pineville—Dpt. State Institutions, R. L. Pettit, dir., Baton Rouge, Huey P. Long Hospital addn. $200,000.

★ **La., Ruston**—Louisiana Polytechnic Institute, C. Cottingham, pres., Ruston, training school, $250,000; women's dormitory, $175,000; women's dormitory, $200,000; men's gymnasium, $200,000; chemistry bldg., $150,000; men's dormitory, $175,000; student center, $150,000; swimming pool, $160,000; installing well water plant, $100,000; stadium unit, $100,000. Financing provided.

Me., Millinocket—Town, Bd. Selectmen, Town Hall, municipal bldg., Penobscot Ave. $300,000. Financing not provided.

Me., Bangor—State H. C. Greenleaf, comr. Institutional Services, State House, Augusta, brick, steel, concrete dormitories at State Hospital, $250,000. Financing not provided.

★ **Mass., Lynn**—City office of Mayor, City Hall, city hall. To exceed $500,000 to $1,000,000. Financing not provided.

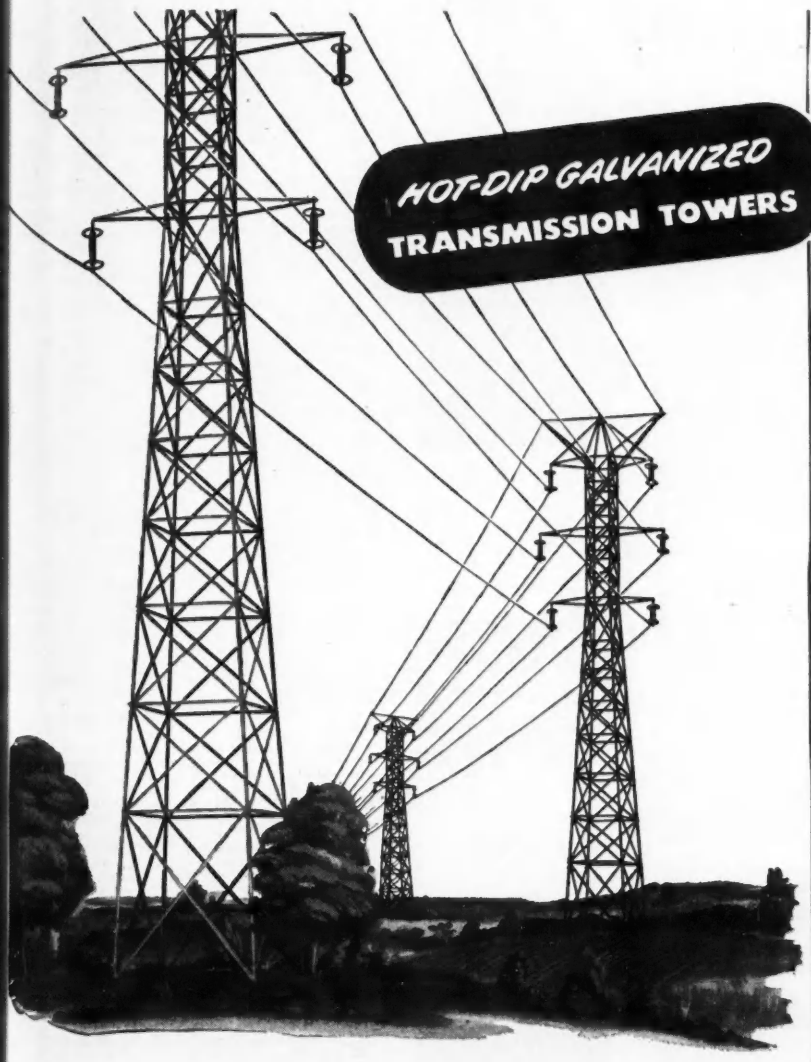
Mass., Malden—City Fire Dpt., City Hall, fire stations on Salem St. and Pleasant St. $100,000 each.

★ **N. Y., Potsdam**—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, auditorium, library, administration and classroom bldg., at State Teachers College, Dpt. Educ., Education Bldg., Albany, Zone 1, $540,000.

★ **N. Y., Sonyea**—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, female infirmary bldg. for 200 patients at Craig Colony, for Dpt. Mental Hygiene, State Office Bldg., Albany, Zone 1, $722,427.

N. C., Oxford—Municipality, J. I. Thompson, clk., auditorium (war memorial). $150,000.

O., Franklin—Village, J. T. Riley, mayor, City Hall, bond election in November, memorial bldg., housing municipal and twp. offices, fire dept., public library and veterans quarters, $250,000. Legal obstacles to be overcome, financing not provided.



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POSTWAR PROJECTS (Cont'd.)

O., Grove City—Franklin Twp. Dist. Bd. Educ., Grove City, school, **$278,000.** Legal obstacles to be overcome, financing not provided.

O., Napoleon — Memorial Hospital Bd. Trustees, Napoleon, R. Gilbert, archt., 3 story hospital and nurses' home. **$250,000.** Bond election in November. Land rights not cleared, financing not provided.

★**Tex., Austin**—State, Austin, state courts bldg., 11 and Congress Sts. **$1,000,000.** Financing provided. CD 4/20—ENR 5/3.

Tex., Sealy — Sealy Independent School Dist., Sealy, high school. **$200,000.**

Wash., Longview — Longview Housing Auth., Longview, 125 housing units, **$400,000.** Financing not provided.

Wis., Algoma—City, E. W. Nell, clk., City Hall, hospital. **$180,000.** Financing not provided.

★**B. C., Penticton**—Municipality, school, **$500,000.**

Ont., Oakville—Municipality, high school, **$160,000.**

Ont., Stouffville—Bd. Educ., c/o G. J. Storey, Stouffville, assembly hall and boiler house. **$150,000.**

PLANS UNDER WAY

★**Calif., El Cerrito**—City, City Hall, plans by D. D. Stone & L. B. Mulloy, assoc., 381 Bush St., San Francisco, hospital. **$500,000.** Financing not provided.

★**Calif., Long Beach**—Bd. Educ., Long Beach, plans by H. R. Davies, Security Bldg., Technical Institute. **$1,000,000.** Financing provided. CD 2/21—ENR 3/8.

Calif., Roseville — Roseville Joint Union High School, Roseville, plans by C. F. Dean, California State Life Bldg., Sacramento, auditorium. **$350,000.** Financing not provided.

Ill., Aledo—Bd. Comrs. Mercer Co., Aledo, plans by W. H. Schulzke, 1620 5 Ave., Moline, hospital. **$300,000.** Bond election June 4. CD 2/16—ENR 3/22.

Ill., Chicago—Bd. Educ., 228 N. LaSalle St., preliminary plans by J. C. Christensen, 228 N. LaSalle St., rehabilitating Pickard School, 2201 W. 21 Pl., **$83,000**; Foster School, 720 O'Brien St., **$80,000.** Financing not provided.

Mass., Amherst—Commonwealth of Massachusetts, Dpt. Educ., 200 Newbury St., Boston, plans completed by Edward C. Brown Co., 77 Summer St., Boston, brick, steel, concrete power plant, Massachusetts State College. **$325,000.** Financing not provided. CD 1/7—ENR 1/27.

Mass., Ashburnham—Town, D. S. Jones, supt. Schools, Town Hall, plans by H. E. Mason, 15 Prospect St., Leominster, Dolly Whitney Adams School. To exceed **$150,000.** Financing not provided.

Mass., Gardner—Dpt. P. Wks., City Hall, public works plant, house equip., materials, tools, repairing facilities. **$55,000.** Financing not provided. E. J. Teir, City Hall, engr.

Mass., West Boylston — Town, Supt. Schools, Town Hall, plans by H. E. Mason, 15 Prospect St., Leominster, high school addn. To exceed **$150,000.** Financing not provided.

★**N. Y., New York**—New York City Housing Auth., 122 E. 42 St., Zone 17, plans by Walker & Gillette, 19 E. 53 St., Zone 22, Sidney L. Strauss, 70 E. 45 St., Zone 17, and J. Mackenzie, 5 E. 57 St., Zone 22, 1,700 units, Jacob Riis Houses, on site bounded by E. 6 St., Ave. D, E. 13 St. and East River Dr. **$8,000,000.** Financing provided.

★**N. Y., Rochester**—Dpt. Mental Hygiene, State Office Bldg., Albany, Zone 1, plans by M. J. DeAngelis, 1403 Temple Bldg., medical-surgical-infirmary bldg., MH-88, **$8,370,000**; Orleans Bldg. addn., MH-90, **$248,000.** Funds available. R. E. Sluyter, Dpt. Mental Hygiene, State Office, Albany, archt. W. A. Clifton, c/o owner, supery. engr. CD 11/29—ENR 12/14.

N. D., Wahpeton—Bd. Educ., M. Peachel, clk., City Hall, plans by F. W. Jackson, American National Bank Bldg., St. Cloud, Minn., and K. A. Hennings, 1103 N. 2 St., North Fargo, school addn., **$190,000.** Bond issue approved.

★**O., Dayton**—Bd. Comrs. Montgomery Co., Dayton, brick, steel, concrete Juvenile Detention Home, **$750,000.** Financing not provided. A. Bakos, Court House, co. engr.

★**O., Dayton**—Bd. Comrs. Montgomery Co., Dayton, imprvs. at Stillwater Sanatorium, consisting 245 bed addn., nurses' home and power plant. **$2,000,000.** Financing not provided. A. Bakos, Court House, co. engr.

O., Toledo—City, Safety Bldg., recreation bldg. and indoor pool near downtown area. **$185,000.** C. E. Hatch, City-County Plan Comn., Court House, secy.-engr.

Okla, McAlester—City, Wm. Jones, mayor, City Hall, plans 5% completed auditorium, **$150,000.** Financing not provided. R. Collins, McAlester, consult. engr.

Okla., Tishomingo—Bd. Agriculture, Capitol, plans 5% completed by R. F. Ferguson, Ada, addnl. science hall at Murray School for Agriculture. **$150,000.** Financing not provided.

†**R. I., Barrington**—Pub. Bldgs. Admin., 18 and F Sts. N.W., Wash. 25, D. C., plans under way concrete, brick, stone post office. To exceed **$150,000.**

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POSTWAR PROJECTS (Cont'd.)

S. D., Milbank—Bd. Educ., W. Rachel, clk., City Hall, plans by Perkins & McWayne, Sioux Falls, high school. $185,000. Bond election in Fall.

★**Tex., Austin**—Pub. Bldgs. Admin., 18 and F Sts. N.W., Wash. 25, D. C., plans under way 3 story, concrete, brick, tile, etc. Post Office addn. $275,000. Financing provided.

★**Tex., Dallas**—Bd. Educ., Akard and Royal Sts., plans under way Senior High School, $350,000; Junior High School, $300,000; school and enlargement and addns. to some schools, at Oak Cliff, $300,000. Financing provided. CD 11/9—ENR 11/30.

★**Tex., Dallas**—City and Dallas Co., City Hall, preliminary surveys hospital, $3,000,000. Financing not provided. Geo. L. Dahl, Southland Life Bldg. Annex, consult. engr.

★**Tex., Lamarque**—Lamarque Independent School Bldg., Lamarque, plans 50% completed by Hedrick & Lindsley, Inc., 811 Sc. Standard Bldg., Houston, Senior High School, etc. $600,000. Financing provided. CD 1/5 ENR 1/25.

★**Tex., Mercedes**—Mercedes Housing Auth., c/o F. Langford, chn., Mercedes, plans 10% completed, 200-unit housing. $600,000. Financing provided.

Tex., Winnie—Winnie Consolidated Ind. School Dist., c/o G. C. Jackson, Jr., Anahuac, plans 25% completed by Emory & White, Livingston, hollow tile, stucco, plaster, school bldg. unit. $150,000. Financing not provided.

Vt., Canaan—Town School Bd., Town Hall, plans by Heacock & Platt, 152 N. 15 St., Phila, Pa., concrete, brick school. Approx. $150,000. C. A. Blatchely, Drexel Bldg., Phila, Pa., consult. engr.

Vt., Vergennes—City School Dpt., City Hall, plans by Freeman, French & Freeman, 138 Church St., Burlington, 2 story, basmnt., concrete, brick high and grade school. $150,000-$200,000.

Wash., Moses Lake—School Bd., Moses Lake, plans by Geo. M. Rasque & Son, Washington Trust Bldg., Spokane, high school. $150,000. Approved $50,000 bond issue. CD 4/20—ENR 5/3.

Wash., Ritzville—School Bd., Ritzville, plans by Geo. M. Rasque & Son, Washington Trust Bldg., Spokane, school. $200,000. Financing not provided. CD 2/21—ENR 3/1.

Wash., Spokane—School Bd., W. 503 Ave., plans by Whitehouse & Price, Hutton Bldg., 2 story Field Grade School. $150,000. Financing not provided.

READY FOR BIDS

Ore., Pendleton—State Bd. Control, Salem, plans completed by L. D. Howell, Fitzpatrick Bldg., Portland, admission hospital at Eastern Oregon State Hospital. $225,000. Financing available. CD 4/20—ENR 5/3.

★**Ore., Salem**—State Bd. Control, State Capitol, plans completed by Sutton, Whitney & Aandahl, Lewis Bldg., Portland, ward bldg. at state hospital, $275,000; plans completed by P. Bellusechi, 2040 S.W. Jefferson St., Portland, treatment hospital at Oregon State Hospital, $550,000; plans completed by Wolff & Phillips, Pearson Fourth Avenue Bldg., Portland, advanced school bldg. at State School for Deaf, $170,000; and school bldg., at State School for Blind, $160,000; plans completed by Barrett & Logan, 194 S.W. 4 St., Portland, employees dormitory at Oregon Fairview Home for Feebleminded, $150,000. Financing provided. CD 6/19—ENR 6/29.

Ore., Salem—State Bd. Control, State Capitol, Salem, plans completed by Sutton, Whitney & Aandahl, Lewis Bldg., Portland, chapel and recreation hall at State Hospital. $190,000. Financing provided. CD 4/2 —ENR 5/3.

Ore., Woodburn—State Bd. Control, Capitol, Salem, plans completed by T. Burns, Pittock Block, Portland, State Training School for Boys, incl. school and shop bldg., boys' dormitory, segregation cottage $3 superintendents' cottage. $217,000. Financing provided. CD 4/20—ENR 5/3.

★**Tex., Galveston** — University of Texas c/o Bd. Regents, Austin, plans completed by R. L. White, c/o University of Texas, Austin, 3 story hospital pavilion addn. consisting of several units, for 600-bed capacity, $2,000,000. Financing provided. CD 8/25—ENR 9/7.

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Send ready-for-bids projects news to Elsie Eaves, Manager Business News Department, Engineering News-Record, 330 W. 42 St., New York 18, N. Y.

PROJECTS CANCELLED

★**Tex., Austin**—State, Bd. Control, Austin, project cancelled, state office and store bldg. $2,000,000. CD 2/14—ENR 3/8.

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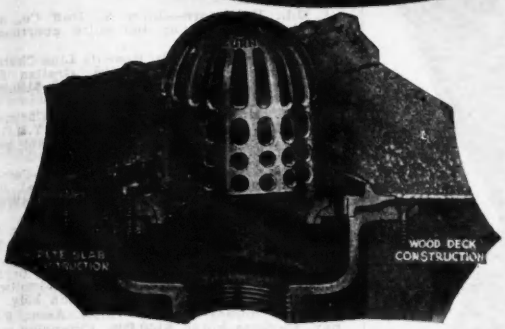

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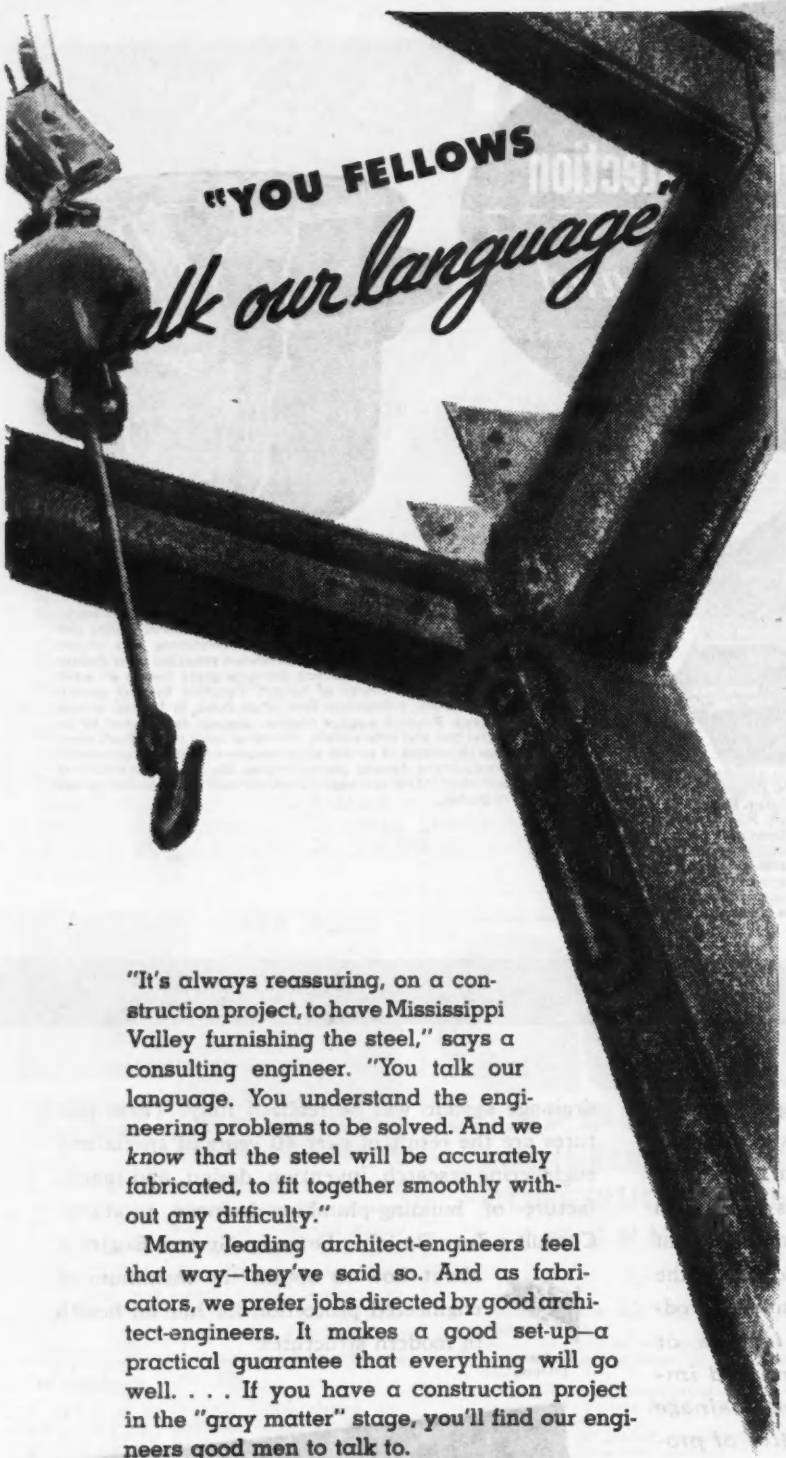

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POSTWAR PROJECTS (Cont'd.)

ADVANCED TO ACTIVE STATUS

Tex., Longview—Bd. Educ., Longview, project cancelled school. $150,000. Work now going ahead. P. M. Geren, 306½ Burnet St., Fort Worth, archt. CD 1/12—ENR 1/25.

COMMERCIAL BUILDINGS

PROPOSED WORK

★ **Conn., Wallingford**—Gaylord Farm Sanatorium, F. C. Walcott, Norfolk, chn. Financing Com., tuberculosis hospital addns., imprvs., alterations, $600,000. Financing not provided.

Ga., Canton—Reinhardt College, c/o Prof. J. R. Burgess, Jr., Canton, administration bldg., facilities, $250,000. Site purchased.

★ **Ind., South Bend**—University of Notre Dame, South Bend, Rev. H. O'Donnell pres., college union bldg., $1,000,000 or more, incl. equip.; graduate residence hall, $750,000 or more, incl. equip.; 3 or 4 story, brick, concrete steel residence hall, $750,000 or more, incl. equip.; chemistry bldg. with laboratory, $250,000 or more, incl. equip.; memorial chapel, $150,000 or more; brick, stone, steel library, $250,000 or more; auditorium, $1,000,000 or more.

★ **Md., Baltimore**—John K. Ruff Co., 100 W. 22 St., about 400 suite apartment $550,000.

Mass., Aldenville—St. Rose de Lina Church, Rev. Chas. N. Fortin, 600 Grallan St., Chicopee Falls, church. To exceed $150,000. Financing not provided.

Mass., Haverhill—Young Men's Christian Assn., 175 Main St., brick, steel Y.M.C.A. bldg. Over $150,000. Financing not provided.

★ **Mass., South Boston (Boston)**—Carney Hospital, Old Harbor St., hospital, Old Harbor St. To exceed $500,000. Financing not provided.

Mass., Ware—St. Mary's Parish, Rev. V. Kustox, pastor, Ware, parochial school. To exceed $150,000. Financing not provided.

Mich., Hillsdale—Hillsdale College, Dr. H. L. Turner, pres., Hillsdale, men's dormitory, library, modern physical education bldg.

Mont., Sidney—Sidney Hotel Assn., Sidney, 60-room hotel. $150,000. Financing partially available.

★ **N. J., Newark**—Prudential Insurance Co., 763 Broad St., slum clearing housing covering 25 blocks. $19,000,000.

N. C., Mount Airy—Young Men's Christian Assn., c/o Jno. D. Thompson, mayor, City Hall, Y.M.C.A. bldg. $300,000. Financing provided.

N. C., Reidsville—Young Men's Christian Assn., c/o W. A. Trotter, mayor, City Hall, Y.M.C.A. bldg. $300,000. Financing not provided.

O., Toledo—Jewish Federation, 1900 Linwood St., community center, incl. swimming pool, gymnasium, class and meeting rooms, auditorium and stage, dining room, etc. $250,000 or more. Financing not provided.

★ **Tex., Dallas**—Southwestern Medical Fdn., 3301 Junius St., main hospital bldg., $4,000,000-$5,000,000. Financing provided.

Tex., Houston—Congregation Emanu El, c/o Dr. A. S. Green, 5213 Montrose St., church and educational bldg., etc. $150,000. Financing provided. Site purchased.

Tex., Houston—Robischung-Kiesling Corp., 4805 Travis St., 3 story, bsmnt. commercial bldg. $150,000. Site purchased. Financing provided.

Tex., Houston—Salvation Army, 305 San Jacinto St., Galveston, community center, $200,000. Financing not provided.

Tex., Houston—Museum of Fine Arts, c/o Jas. Chillman, 5700 Main St., expan. Museum of Fine Arts Bldgs. $150,000. Financing not provided.

★ **Wash., Parkland**—Pacific Lutheran College, Dr. S. C. Eastvold, pres., Parkland. 2 women's dormitories, each $150,000; men's dormitory, $150,000; commons bldg., $200,000; reconstruct present gymnasium into science bldg., $60,000; completing library, $40,000; chapel and music hall, $150,000; central heating plant, $50,000; athletic stadium, $150,000; landscaping, $15,000. Financing not provided. CD 11/9—ENR 11/30.

Wash., Seattle—Children's Orthopedic Hospital, 100 Crockett St., Zone 9, hospital addn. $150,000. Financing available.

Wash., Spokane—Whitworth College, F. F. Warren, pres., Country Home Est., administration bldg. $250,000. Financing not provided.

PLANS UNDER WAY

Calif., Alhambra—Bank of America, 660 S. Spring St., Los Angeles, plans by R. Shaw, 649 S. Olive St., Los Angeles, Class A bldg. for bank purposes, Stoneman Ave. and Monterey St., $175,000.

★ **Calif., Beverly Hills**—Owner, c/o A. R. Walker & Assoc., archts., 301 Security Title Insurance Bldg., Los Angeles, preliminary plans completed 4 story, 110x110 ft., rein.-con. office bldg., South Beverly Dr. Over $500,000.

Colo., Denver—Colorado Women's College, E. 17 Ave. and Poplar St., plans by S. Arthur Axtens, Cooper Bldg., dormitory, $200,000;

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POSTWAR PROJECTS (Cont'd.)

combination dining room and gymnasium, $250,000. Financing not provided.

Ill., Chicago—Emanuel Congregation, 70[illegible] W. Buckingham Pl., preliminary plans by L. R. Solomon & Assoc., 18[illegible] N. Wabash Ave., 1 story, brick, concrete, steel, synagogue, Sheridan Rd. and Surf, $400,000. Financing provided.

La., New Orleans—Orleans Levee Bd., New Court House Bldg., S. M. Lemarie, pres., New Orleans, plans by Wogan & Bernard, Baronne Bldg., and A. Perez, Adubon Bldg., 2 story community center in Lake Vista with 48 ft. illuminated tower in center, incl. super market, drug store, hardware and vanity store, beauty salon, etc., $200,000.

Md., Baltimore—St. Matthews Evangelical Lutheran Church, c/o Rev. G. Siegenthaler, pastor, Mayfield and Norman Aves., plans by Buckler & Fenhagen, 325 N. Charles St., 1 and 2 story, stone church. $150,000.

Mass., Worcester — Bd. Trustees Holy Cross College, Worcester, plans by Maginnis & Walsh, 126 Newbury St., Boston, brick, steel, concrete gymnasium and swimming pool, $375,000. Financing not provided. CD 1/31—ENR 3/8.

Minn., Thief River Falls—Mercy Hospital, C. D. Gustafson, pres. Bd. Trustees, plans by Ellerbe & Co., 1021 E First National Bank Bldg., St. Paul, hospital. $150,000.

★**Mo., Fayette**—Central College, H. S. Devore, pres., Fayette, plans by H. F. Graf, 2825 Olive St., St. Louis, Zone 8, 1 story, bsmnt. girls dormitory, dining facilities and physical culture room, $250,000; 2 story memorial gymnasium and community bldg., $250,000; 2 story administration bldg., $50,000.

Mo., Normandy (St. Louis, 21, P.O.)—Logan Basic College of Chiropractic, H. B. Logan, pres., 7701 Florissant Rd., sketches by Marcel Boulicault, 1204 Ambassador Bldg., 411 N. 7 St., St. Louis, Zone 1, 2 story, smnt., brick, rein.-con. college bldg., 7701 Florissant Rd. Approx. $200,000.

★**O., Oxford**—Western College Bd. Trustees, Oxford, plans by C. F. Celarius, 11[illegible] E. Fourth St., Cincinnati, building program, incl. science bldg., dormitory. $1,000,000. Financing not provided.

Okla., Oklahoma City—Young Mens' Christian Assn., 125 N.W. 2 St., plans 10% completed Sprey & Sorey, Braniff Bldg., Y.M.C.A. bldg. and dormitory, $200,000. Financing not provided.

Ore., Salem — Williamette University, Salem, plans by P. Belluschi, 2040 S.W. Jefferson St., Portland, men's dormitory, $150,000. Financing not provided. CD 10/1[illegible] —ENR 11/2.

★**Tex., Dallas**—Southern Methodist University, Dallas, plans by M. Lemmon, Tower Petroleum Bldg., married students' dormitory, $150,000; Theological students' dormitory, $150,000; chapel, $150,000; classroom bldg., $150,000.. Financing provided. CD 2/13—ENR 3/8.

Tex., Fort Worth — Broadway Baptist Church, 305 West Bway., preliminary plans by W. C. Hedrick, 1015 First National Bank Bldg., church. $300,000. CD 9/29/43—ENR 10/7/43.

Tex., Forth Worth—Broadway Presbyterian Church, 3217 Stadium, plans 50% completed by C. O. Chromaster, Century Bldg., church. $350,000. Financing provided. Carter & Burgess, Century Bldg., consult. engrs. CD 4/27—ENR 5/3.

Tex., Fort Worth—Fundamental Baptist Bible Institute, 4 and Taylor Sts., plans by C. O. Chromaster, Century Bldg., 6 story dormitory. $200,000.

Tex., Fort Worth—Our Lady of Victory College, 3410 Hemphill St., preliminary plans by W. G. Hedrick, First National Bank Bldg., dormitory. $500,000. Financing available. CD 1/15—ENR 1/25.

Tex., Fort Worth—Texas Wesleyan College, Fort Worth, plans by W. C. Hedrick, First National Bank Bldg., dormitory, over $150,000; auditorium-library, over $150,000. Financing not provided. CD 11/2—ENR 11/16.

★**Tex., Fort Worth**—Travis Avenue Baptist Church, 3041 Travis Ave., plans by W. G. Clarkson, 1005 First National Bank Bldg., church. $500,000. CD 4/13—ENR 5/[illegible]

Tex., Houston—P. R. Plumb & N. H. Mitchell, 4522 Griggs Rd., plans 25% completed by H. D. Frankfurt, 420 Union National Bank Bldg., 2 story, 158 unit, structural clay tile, stucco apartment hotel. $300,000. Financing provided. CD 4/30.

Tex., Houston—St. John The Divine Episcopal Church, 2450 River Oaks Blvd., plans completed by Hiram A. Salisbury, 15[illegible] Buffalo Dr., rein.-con., stone parish hall and educational unit. $214,000. Financing provided.

Tex., Monahans—J. B. Tubb, Monahans, plans 75% completed by Haynes & Strange, 415 Myrick Bldg., Lubbock, 6 story, bsmnt. concrete, steel, brick, hotel and store. $200,000. Financing provided. Zumwalt & Vinther, Mercantile Bank Bldg., Dallas, consult. engrs. CD 11/10—ENR 11/16, under Commercial, CA.

Wis., Burlington — Burlington Memorial Hospital, Burlington, plans by G. J. De Gelleke, 152 W. Wisconsin Ave., Milwaukee

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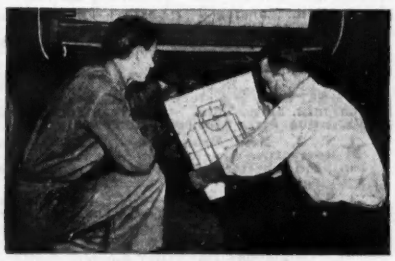

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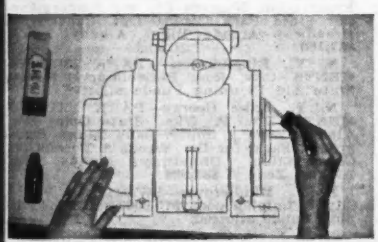

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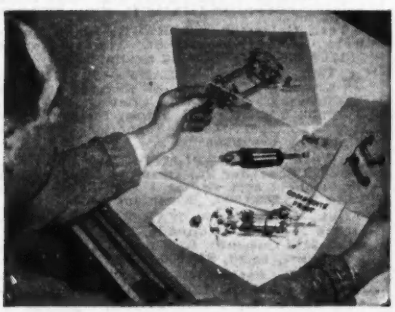

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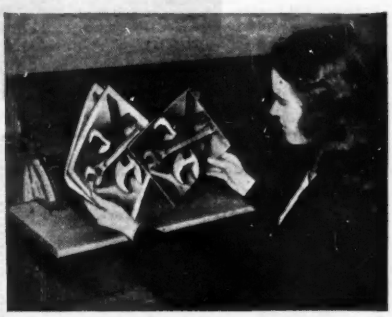

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POSTWAR PROJECTS (Cont'd.)

Zone 3, 2 story hospital addns. $150,000. Financing not provided.

READY FOR BIDS

Tex., Mathis — Sacred Heart Parish, Mathis, plans completed by L. M. J. Dielmann, 145 North St., San Antonio, reinforced con., brick, hollow tile school auditorium and living quarters. $150,000. Financing provided.

Tex., Odessa—George Elliott (Estate), Odessa, plans completed by Haynes & Strange, 415 Myrick Bldg., Lubbock, 2 story, hotel unit and remodeling, imprv. hotel unit. Over $150,000. Financing provided. Zumwalt & Vinther, Mercantile Bank Bldg., Dallas, consult. engrs. CD 3/7—ENR 3/22, under Projects Cancelled.

CONTRACTS AWARDED

R. I., Providence—A. LaMarre, 25 Capwell Ave., Pawtucket, 25 or 30 five room residences, Benefit St., separate contracts. Approx. $150,000. O. A. Garwin, 72 Weybosset St., archt. CD 4/25—ENR 5/3.

INDUSTRIAL BUILDINGS

PROPOSED WORK

Conn., Hartford—PLANT—B. Lenhardt, 35 New Britain Ave., 2 story meat product mfg. plant, brick. $45,000.

Mass., Lynn — PLANT — Durkee-Mower, Inc., 66A Brookline St., mfg. plant, Brookline and Empire Sts. To exceed $50,000.

★**Mich., Lansing** — PLANT — Duo-Therm Heating Div. of Motor Wheel Corp., Lansing, brick, steel, concrete factory addns. $2,000,000. Financing provided.

★**Mo., St. Louis**—PLANT—Wm. R. Warner & Co., Inc., R. S. Reamer, plant mgr., 404 S. 4 St., Zone 2, 6 story, bsmnt., brick, rein.-con. mfg. bldg., Third St. between Spruce and Valentine Sts. $500,000—$1,000,000.

★**N. J., New Brunswick**—PLANT—Delco Remy Div. General Motors Corp., Anderson, Ind., battery plant, $500,000 or more with equip. 27 acre site purchased.

★**N. Y., Lackawanna**—MILL—Bethlehem Steel Co., 1915 Hamburg Turnpike, bar producing mill, at Lackawanna Plant, $20,000,000.

O., Columbus—FACTORY—Joyce California, Inc., 627 W. Mound St., factory, on 3-acre site. Over $40,000.

O., Columbus—PLANT—Lilley-Ames Corp., 293 E. Long St., plant imprvs., expansion, $330,000.

★**O., Lima**—PLANT—Pillsbury Mills, Inc., Lima, concrete, brick, steel feed-mixing plant, $500,000.

Pa., Phila.—TRUCK LOADING STATION—M. Hossack, 5 and Oxford Sts., large truck loading station, on 101x439 ft. site. $200,000.

Tex., Galveston—STORAGE—Black Hardware Co., 2217 Strand St., 3 story storage bldg. $60,000. Financing available.

★**Tex., Houston** — PLANT — L. Krausse, Krausse Mfg. Co., & Krausse Tool & Engineering Co., 3603 Clinton Dr., San Antonio, 2 mfg. plant bldgs., for producing tool and tool room production. $500,000. Financing provided.

★**Wash., Seattle**—PLANT—Ford Motor Co., 3000 Schaeffer St., Dearborn, Mich., parts depot on 12 acre site on 4 Ave. S. near Spokane St. $800,000. Financing provided.

Ont., Pickering — WAREHOUSE — Armstrong Food Co. of Canada, Ltd., J. A. Ware, mgr., 2114 Queen St. E., Toronto, food storage warehouse, brick, $40,000.

Ont., St. Catherines—PLANT—F. C. McCordick Leathers, Ltd., St. Catherines, tanning and curing plant. $40,000.

PLANS UNDER WAY

Ill., Chicago — PLANT — Hollanderizing Corp. of America, 411 S. Sangamon St., preliminary plans by Loewenberg & Loewenberg, 111 W. Monroe St., highly specialized fur cleaning and revitalizing plant, Harrison St. between Green and Peoria Sts. $350,000. Financing provided. CD 4/26.

★**O., Hamilton**—PLANT—Fisher Body, Div. General Motors Corp., T. P. Archer, vice pres. and genl. mgr., General Motors Bldg., Detroit, plans under way 2 story, automobile body mfg. plant, Dixie Hy., at B. & O. Railroad and Symmes Rd. $4,000,000. Albert Kahn Associated Architects & Engineers, Inc., 345 New Center Bldg., Detroit, Mich., consult. engr. A. F. Kisinger, First National Bank Bldg., Hamilton, assoc. engr. CD 4/11—ENR 4/19.

Tex., Dallas—MANUFACTURING—Better Monkey Grip Co., L. M. Everett, Arlington, plans 75% completed by Flint & Broad, Burt Bldg., 1 story, 100x300 ft., brick, steel manufacturing bldg. $100,000. Financing provided. CD 5/4 under Industrial.

Tex., Houston — WAREHOUSES — Jno. B. Saragusa, 1015 Sampson St., and Rob. E. Paine, Jr., 9 Courtland Pl., plans 50% completed I. R. Klein, 328 Bankers Mtg. Bldg., 2 warehouses. Each over $110,000. Financing provided.

Tex., Pasadena — SHOP — Theo. Jensen, Pasadena, plans under way brick, concrete, tile shop. $75,000. Financing provided.

Tex., San Antonio—MACHINE SHOP and WAREHOUSE—San Antonio Implement Co., 347 E. Commerce St., plans 50% completed by Spillman & Spillman, 402 Hicks Bldg., remodeling and addnl. work for machine shop and warehouse, $40,000. Financing provided.

Ont., London—PLANT—John Labatt, Ltd., Simcoe St., plans by J. M. Watt, 343 Richmond St., brewery plant exten. About $200,000. CD 1/15—ENR 2/8.

★**Ont., Windsor**—TERMINAL STATION—Canadian National Rys., H. A. Dixon, ch. engr., 360 McGill St., Montreal, Que., terminal station. About $500,000.

READY FOR BIDS

Tex., Houston—PLANT, etc.—Texas Bolt & Supply Co., Ltd., 2301 Congress St., plans completed by S. H. Dixon, 6902 S. Main St., 1 story, 75 x 150 ft., brick, hollow tile, concrete, mfg. plant and warehouse, $50,000. Financing provided.

CONTRACTS AWARDED

★**N. J., Murray Hill**—LABORATORY—Bell Telephone Laboratories, Inc., 463 West St., New York, N. Y., laboratory bldgs., to Mahony-Troast Constr. Co., 657 Main St., Passaic. Est. $5,000,000 incl. equip. Voorhees, Walker, Foley & Smith, 101 Park Ave., New York 17, N. Y., archts.

★**Wash., Longview** — PLANT — Owens-Illinois Glass Corp., 401 16 Ave., Oakland, Calif., 14 steel, concrete connected bldgs. incl. warehouses, production and office structures, etc., for bottle factory, to The Austin Co., 16112 Euclid Ave., Cleveland, O. Est. $3,500,000. CD 4/14—ENR 5/4.

UNCLASSIFIED

PROPOSED WORK

Neb., Lexington—AIRPORT—City, City Hall, municipal airport. $27,500. Approved $20,000 bond issue. CAA. CD 1/8—ENR 2/8.

New York — CAMP REPLACEMENTS — Dpt. P. Wks., State Office Bldg., Albany, Zone 1, replacement of group camps at Twin Lakes, Lake Tiorati, Lake Kanawauke, Lake Stahahe, Lake Sebago, Rockland Co., for Palisades Interstate Park Comn., Dpt. Conservation, Broadway Arcade Bldg., Albany, Zone 1, $261,500.

New York—COMFORT STATION, etc.—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, comfort station, and shelter, at Whirlpool State Park, Niagara Co., for Niagara Frontier State Park Comn., Dpt. of Conservation, Broadway Arcade Bldg. Albany, Zone 7, $30,000.

New York—PARKING LOT, etc.—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, parking lot and gas station, at Niagara Reservation, Niagara Co., for Niagara Frontier State Park Comn., Dpt. Concervation, Broadway Arcade Bldg., Albany, Zone 7. $87,100.

N. Y., Binghamton — PARK IMPROVEMENTS—City, Ross Park imprvs. $100,000. State Aid Planning Funds allotted.

N. Y., Lake George—PARK IMPROVEMENTS—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, imprv. Lake George Battleground Park, for Div. Lands & Forests. Dpt. Conservation, Broadway Arcade Bldg. Albany, Zone 7, $31,926.

N. Y., Middletown—SWIMMING POOL—City, swimming pool, $75,000. State Aid Planning Funds allctted.

S. C., North Charleston—OIL TERMINAL, etc.—Socony-Vacuum Oil Co., 26 Bway., New York, N. Y., bulk oil terminal and wharves. $100,000 or more.

★**Wash., Spokane**—RADIO STATION—L. Wasmer, Station KGA, Radio Central Bldg., Zone 8, 1 story radio station bldg. $1,000,000. Financing provided. CD 9/8—ENR 9/21.

Wis., Milwaukee—RADIO STATION—M. H. Johns, 231 W. Wisconsin Ave., Zone 3, frequency modulation radio station, $160,000. Legal obstacles to be overcome.

PLANS UNDER WAY

★**Calif., Los Angeles**—SPORTS ARENA—Pan Pacific Corp., Beverly and Fairfax Sts., preliminary plans by Wurdeman & Becket, 6536 Sunset Blvd., Hollywood. 300x450 ft., rein.-con. sports arena. Approx. $500,000.

★**D. C., Wash.**—STADIUM—The Commission of Fine Arts, Interior Dpt. Bldg. Wash., Zone 25, National World War Memorial Stadium, seating capacity between 130,000 and 200,000. Financing not provided. Pettigrew, Cook & Associates, 160 Avery St., Dallas, Tex., archts. CD 5/25/42—ENR 6/3/43.

★**Ill., Chicago**—BEACH IMPROVEMENTS, etc.—City Dpt. P. Wks., Bureau Engineering, City Hall, plans under way Rainbow Beach imprv., incl. constructing park facilities and bathing beach from 75 to 79 Sts., $1,000,000; plans 106 playgrounds for children in neighborhoods most deficient in play areas with bldgs., play apparatus and wading pools, $15,750,000; preliminary plans under way enlargement of store yards, storehouse

POSTWAR PROJECTS (Cont'd.)

and greenhouses, near S. Union Ave. and 49 St., $300,000. Financing not provided.

★**Ill., Chicago**—PARK IMPROVEMENTS, etc.—City, Dpt. P. Wks., Bureau Parks, City Hall, preliminary plans under way imprv. center parkways and traffic islands, grading, landscaping, paving, $1,000,000; rehabilitation, completion city playgrounds, playground addns., replacing unsafe and obsolete equip., $1,000,000; bathhouse and community bldg. at Rogers Park Beach, $450,000; 50 park shelters and maintenance bldg., $500,000; 3 garage bldgs., vicinity of Irving Park Rd. and Ashland, Belmont and Laramie, 71 and Western Sts. $180,000. Financing not provided. W. Vaughan, City Hall, dir. Imprvs., Bureau Parks.

★**Ill., Chicago**—PIER—City, Bureau Rivers & Harbors, City Hall, rehabilitation, restoration Navy Pier, $1,100,000. Financing not provided. M. W. Oettershagen, City Hall, engr. CD 4/20—ENR 5/3, under Public.

★**Ill., Chicago**—SUBWAY, etc.—City Dpt. Subways & Superhighways, P. Harrington, comr., 20 N. Wacker Dr., designs and sketches 40 per cent completed, West Side Rapid Transit-Subway Sys., constructing rapid transit facility in tunnel and in strip of West Superhighway, incl. tunnel, open cut and ramp median construction, track work, electrical work, stations, along Congress St. between River and Sacramento Blvd. and branch on Kedzie Ave. to Lake St., $33,500,000; designs and sketches 25 per cent completed Transit Tunnel in Washington St., constructing high level tunnel from Clinton Ave. to Grant Park for street car operation, complete with track, lighting, stations, etc., $7,000,000; design and sketches underway completing Dearborn St. subway in Milwaukee Ave., Lake, Dearborn and Congress Sts., incl. 0.63 mi. tunnel construction, transportation equipt., finish station, $10,000,000. P. F. Girrard, 20 N. Wacker Dr., project engr.

Mass., Amherst—STEAM DISTRIBUTION SYSTEM—Commonwealth of Massachusetts, Dpt. Educ., 200 Newbury St., Boston, plans completed steam distr. sys., underground piping, etc., at Massachusetts State College. Financing not provided. E. C. Brown, 77 Summer St., Boston, consult. engr.

Mass., Leominster — RECREATIONAL CENTER—City, R. A. Middlemas, treas., Leominster Recreation Corp., Leominster, plans by H. E. Mason, 15 Prospect St., recreation center, incl. park and bldg. $250,000. Financing not provided.

Mass., Medford—SWIMMING POOL—Tufts College, Medford, plans under way concrete, stone, tile swimming pool in Cousens Gymnasium. To exceed $50,000. A. A. Dirlan, 124 Cedar St., Malden, archt. Fay, Spofford, & Thorndike, 11 Beacon St., Boston, consult. engrs.

Neb., Omaha—STADIUM—City, J. Rosenblatt, chn. Com., City Hall, voted $480,000 bonds, municipal sports stadium. L. A. Daly, Insurance Bldg., archt. CD 2/21—ENR 3/8.

O., Marion—AIRPORT—City, City Hall, airport, $100,000. Financing not provided. T. Cathers, Municipal Bldg., city engr. CD 1/10—ENR 1/25.

O., Marion—RECREATIONAL CENTER, etc.—City, City Hall, recreational center and swimming pool, $100,000. Financing not provided. T. Cathers, Municipal Bldg., city engr.

Okla., Clinton—AIRPORT—City, W. A. Shouse, clk., City Hall, plans 5% completed airport, $400,000. Land rights not cleared, legal obstacles to be overcome, financing not provided. Hudgins, Ball & Co., Cotton Exchange Bldg., Oklahoma City, consult. engrs. CD 1/11—ENR 1/25.

Okla., Cordell—AIRPORT—City, P. Peters, clk., Cordell, plans 5% completed airport, $200,000. Land rights not cleared, legal obstacles to be overcome, financing not provided. F. Ford, Cordell, engr. CD 1/11—ENR 2/8.

Tex., Austin—BATHHOUSE—City, W. E. Seaholm, mgr., City Hall, plans under way bathhouse at Barton Springs, $50,000. Financing not provided. Associated Architects of Austin, Nalle Bldg., consult. archts.

Wis., Port Edwards—NATATORIUM—Village, plans by Childs & Smith, 430 N. Michigan Ave., Chicago, Ill., natatorium, $100,000. Financing not provided.

Ont., New Toronto—SWIMMING POOL etc.—Town, W. E. MacDonald, 377 Lake Shore Rd., swimming pool and indoor skating rink on Birmingham St. $225,000. W. B. Redfern, of James, Proctor & Redfern, c/o owner, town engr.

READY FOR BIDS

Minn., Elk River—DISTRIBUTION SYSTEM—Village, A. H. Briggs, clk., City Hall, plans completed distr. sys. for electric light and power plant, $70,000. Financing provided. Tolts, King & Day, 1509 Pioneer Bldg., St. Paul; consult. engrs. CD 3/14—ENR 4/5.

ADVANCED TO ACTIVE STATUS

Tex., Longview—AIRPORT BLDG., etc.—Gregg Co., c/o M. H. Gibson, judge, Longview, project cancelled airport administration bldg., and control tower, $170,000. Work now going ahead. Flint & Broad, Burt Bldg., Dallas, archts. CD 2/21—ENR 3/8.

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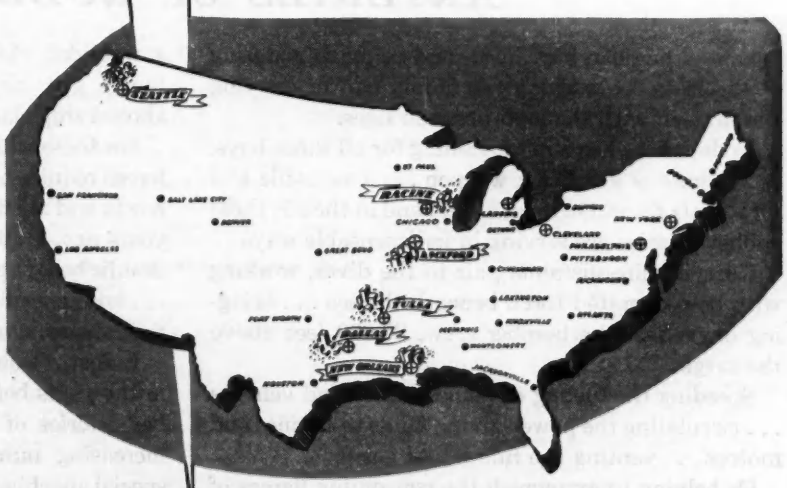

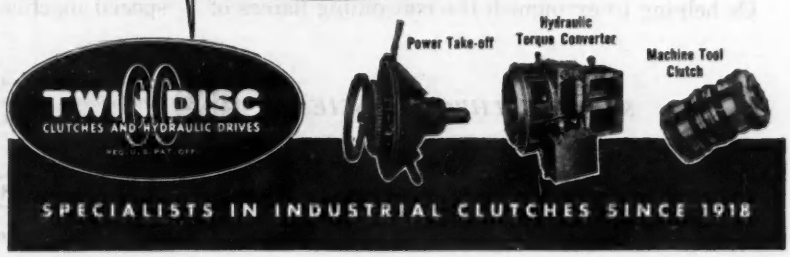

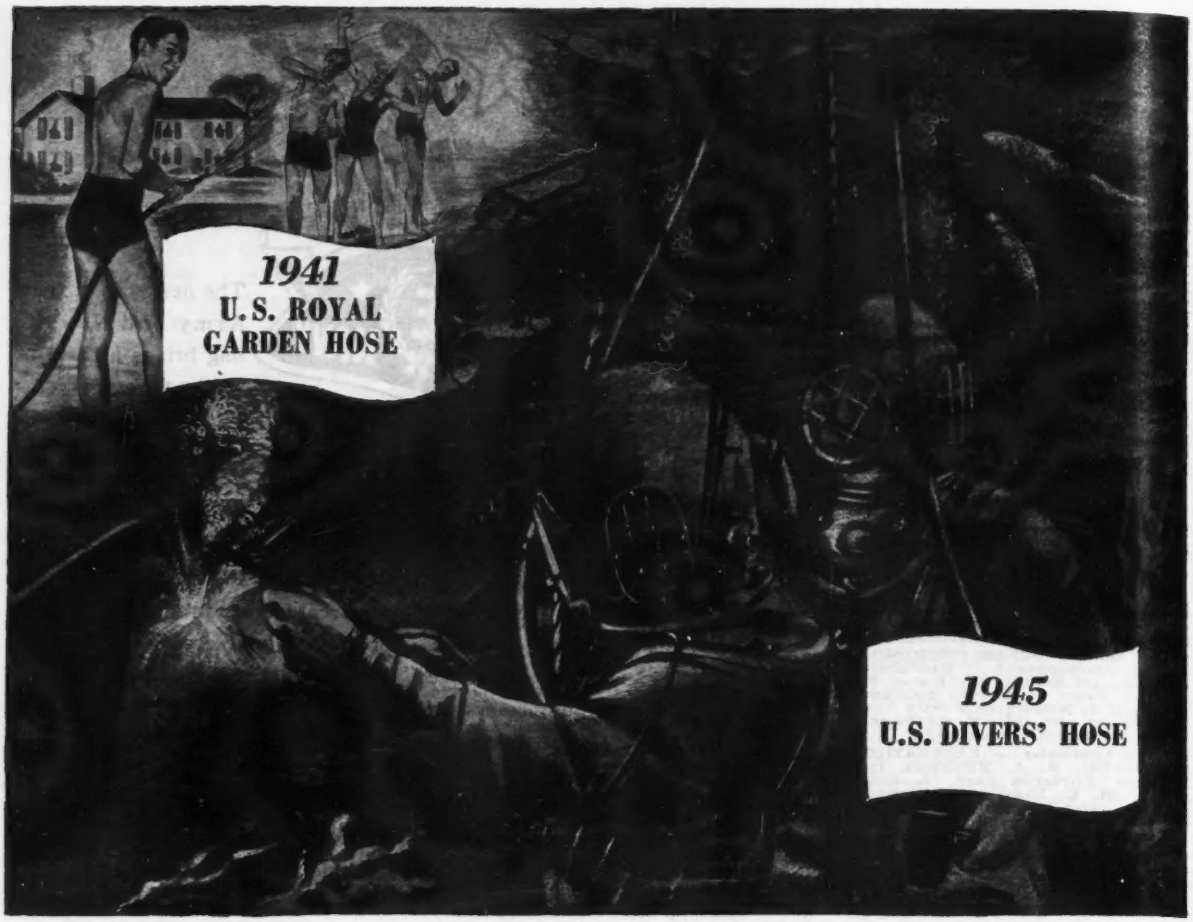

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WATER SUPPLY

PROPOSED WORK

Conn., Norwich—City, M. J. Shea, pres. Bd. Water Comrs., City Hall, preliminary plans water purification plant.

Minn., Thief River Falls—City, P. G. Pederson, clk., filtration plant. $35,000 or more. Lium & Burdick, Grand Forks, N. D., engrs.

Mont., Lodge Grass—City, W. T. Shaw, clk., voted $35,000 bonds, water sys. B. C. Lillis, Billings, consult. engr.

N. Y., Rochester—F. W. Ereth, city purch. agt., City Hall, rejected bids Apr. 19, re-lining Conduit 2 in city's water sys. between Hemlock Lake and Rush Reservoir, relining 31 in. steel pipe with concrete, $450,000. CD 4/13.

O., Bowling Green — City, watermain in east side of city, $30,000; also water tower.

O., Port Clinton—City, miscellaneous imprvs. at city WW plant. $15,000. W. F. Crohen, waterworks supt.

Tex., Corpus Christi—Nueces Naval Base Water Supply Corp., 510 Jones Bldg., 8 and 6 in. c.i. pipe watermains. Over $15,000. Myers & Noyes, 320 Nixon Bldg., engrs.

Tex., Frankston—City, R. Perry, mayor, imprv., exten. WW. $20,250. Koch & Fowler, Gr. Natl. Life Bldg., Dallas, engrs. CD 4/30—ENR 5/3.

Tex., Lamarque — Lamarque Developing Co., (city of Lamarque), Lamarque, award not made for constructing water sys. CD 1/1—ENR 3/15, under LB.

Man., Morden—Municipality, WW sys. $50,000. J. C. D. Taylor, c/o owner, engr.

Ont., Cochrane—Municipality, drilling 750 g.p.m. well, exten. water plant providing for iron reduction, carbon dioxide removal, water softener, filter, storage for 1,000 m.g.p.d. capacity. $50,000. E. W. Oke, P.O. Box 640, engr. CD 4/12—ENR 4/199.

Que., Quebec City—Province of Quebec, Quebec City, boring of artesian wells. $30,-000 voted. Dpt. Colonization, Quebec City, engrs.

Sask., Swift Current—Municipality, 2 mi. water extens. $50,000. V. E. Thierman, City Hall, engr.

BIDS ASKED

Bids Asked May 21

Mass., Andover—Town, G. T. Gilliard, supt. P. Wks., Andover, 2 mi. 12 in. watermains, in Haggetts Pond Rd. Weston & Sampson, 14 Beacon St., Boston, engr. CD 4/30—ENR 5/3.

Bids Asked May 24

Ark., Siloam Springs—City, F. R. Hamilton, mayor, City Hall, WW imprvs., incl. 3 mi. 10 in. flow line, 1 m.g. filter plant and clear well, etc. Plans deposit $15. H. T. Lawrence, 1803 N.W. 21 St., Oklahoma City, Okla., engr. CD 7/27—ENR 5/3.

Wis., Wisconsin Rapids—Waterworks & Lighting Comn., F. L. Steib, mgr., Wisconsin Rapids, 13,500 ft. 14 in. water transmission line from new well to 3rd St. Station, 2 pump houses. Plans deposit $5. Foth, Boyd & Porath, 409 Walnut St., Green Bay, engrs. CD 4/3—ENR 4/5.

Bids Asked May 29

Calif., Oakland — East Bay Municipal Utility Dist., 512 16 St., installing equip., and furnishing, installing other misc. equip., at Bixler Pump. Plant project. J. S. Longwell, ch. engr. Plans deposit $10.

Bids Asked May 31

Mass., Belchertown — Commonwealth of Massachusetts, Metropolitan Dist. Water Supply Comn., 20 Somerset St., Boston, waterwheel, generator, switchgear and appurtenances at transformer substation of Winsor Dam Power Plant. Extended date. K. R. Kennison, ch. engr. CD 4/12—ENR 4/19.

Bids Asked July 2

Fla., Belle Glade—Town, A. L. Wallis, clk., 3 m.g.d. capacity water treatment plant; emergency diesel electric generator plant; 5,000 ft. 12 in. watermains; altitude valve assembly; ground storage reservoir alterations. Plans deposit $45. C. K. S. Dodd, Sarasota, consult. engr.; adv. ENR 5/17.

Symbols and Abbreviations Include:

†	Federal Government
★	Project of $500,000 or over
ENR	Engineering News-Record
CD	Engineering News-Record Construction Daily

Projects—By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger; water supply, earthwork, waterworks, $15,000; other public works, $25,000; industrial buildings, $40,000; other buildings, $150,000.

Classes of Construction

(Name in order of Listing)

Water Supply
Sewers, Waste Disposal
Bridges
Streets & Roads
Earthwork, Waterways
Latin America
Public Buildings
Commercial Buildings
Industrial Buildings
Unclassified

Stages Reported

PROPOSED: (except Streets & Roads): BIDS ASKED (new announcements only). For full calendar, see also preceding issues of ENR);

LOW BIDDERS: On jobs below $500,000 value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: Except awards to low bidders previously reported in low bidder stage.

Dates shown are of issue in which last previous report was published.

LOW BIDDERS

Calif., San Diego—City, Civic Center Bldg., May 8, from American Pipe & Constr. Co., 4635 Firestone Blvd., Los Angeles, 9,600 ft. 42½ and 36 in. steel pipeline, Thorn St., $222,544; 9,400 ft. 36 in. rein.-con., steel pipeline, Bonita Connection pipeline, $183,-505; 4,280 ft. 18 in. centrifugal sprn., rein.-con. pipe and 3,135 ft. 12 in c.i. pipe, Point Loma Water Main, $35,115. City Hydraulic Engr., Civic Center Bldg., engr.

†Mont., Fort Harrison—Veterans Admin., Vermont Ave. between H and I Sts. N.W., Wash. 25, D. C., May 8, concrete water reservoir, from Montana Engrg. & Constr. Co., Helena, $28,500. CD 3/27—ENR 3/29.

N. Y., Poughkeepsie—City Dpt. P. Wks., City Hall, May 7, river intake pipe, from Merritt-Chapman & Scott Corp., 17 Battery Pl., New York, Zone 4, $144,309. CD 5/3.

Wash., Kalama—City, City Hall, May 2, pump. sta., delivery pipeline and float switch electric line, from G. Abraham, Couch Bldg., Portland, Ore., $25,889. CD 4/17—ENR 4/19.

Wis., Oconto—City, May 1, WW sys. imprvs., pump stas., from F. Winninghoff, R 2, West Bend, $24,500; elevated steel tank, from Pittsburgh-Des Moines Steel Co., 35 S. Dearborn St., Chicago, Ill., $25,300. CD 4/24—ENR 4/26.

CONTRACTS AWARDED

†Fla., Datona Beach—U. S. Eng., Post Office Bldg., Savannah, Ga., water distr. sys. and sewage collection sys., for addnl. construction at Welch Convalescent Hospital, to Boyd & Goforth, 1226 W. Forsythe St., Jacksonville, $27,053.

†Ga., Rome—U. S. Eng., Post Office Bldg., Savannah, furnishing, erecting 250,000 gal. elevated wood water tank on 110 ft. steel tower at Batley General Hospital, to W. E. Caldwell Co., 200 E. Brandeis St., Louisville, Ky., $27,019.

Ind., Anderson—City Water Dpt., P. Laux, supt., laying watermains, to Trenton & Sons, Linton, $38,000. V. A. Lee, 8 and Main Sts., city engr.

†Md., Hyattsville—Washington Suburban Sanitary Comn., 4017 Hamilton St., elevated steel water tank, Cabin John, to Pittsburgh Des Moines Steel Co., Neville Island, Pittsburgh, Pa., $66,380. FWA. Bids 4/27, awarded 5/4. CD 4/10—ENR 4/12.

N. C., Ramseur — Town, J. A. Craven, mayor, Town Hall, water imprvs., to W. F. Brinkley, Granite Quarry, $15,476. Bids 5/1. R. H. Moore, Asheboro, consult. engr.

O., Cincinnati—City, H. F. Wagner, purch. agt., furnishing, laying 7,348 ft. 6 and 12 in. cement lined c.i. mains, 1,484 tons castings, gate valves, fire hydrants, etc., Montgomery Rd., Cypress Way and Langdon Farm Rd. Sects., to Crumley, Jones & Crumley, Blue Ash and Hegner Sts., Deer Park, $28,484. Bids 4/18. H. H. Kranz, City Hall, city engr.

O., Cincinnati—City, H. F. Wagner, purch. agt., furnishing, laying approx. 4,789 ft. 6 and 10 in. cement lined c.i. watermain with 8.55 tons fittings, miscellaneous castings in Delta Ave., to O'Connell & Sweeney, Kellogg and Tennyson Sts., $26,203. Bids 4/25. H. H. Kranz, City Hall, city engr.

★†Okla., Oklahoma City—E. M. Simon, city clk., constructing Bluff Creek filter plant and pump. sta., using steel water tank, Okla. 34-205, to Harmon Constr. Co., 1138 N.W. 4 St., $1,032,214. FWA. Bids 5/3, awarded 5/5. CD 5/3—ENR 5/10, under LB.

†Pa., Phila.—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., shallow well for cooling purposes, Navy Yard, NOY 12031, to Layne-New York Co., Inc., 431 Market St., Camden, N. J., $19,955. Bids 4/24. CD 4/17.

Wis., Brokaw—Village, pump. sta., laying sewer and watermains to Bahr Const. Co., 2204 S. 10 St., Manitowoc, $24,637. Bids 5/3. CD 4/24—ENR 4/26.

SEWERS, WASTE DISPOSAL

PROPOSED WORK

★Calif., Bakersfield—North of the River Sanitary Dist. 1, Bakersfield, sanitary sewerage sys., Oildale, Riverview, Highland Park Dist., near here. $500,000. R. E. White, 2617 20 St., engr.

Calif., Long Beach—City Clerk, sanitary sewer, Dist. 13-F, $34,000; storm drain Willow St., Pico Ave. to Santa Fe Ave., $25,000. G. E. Baker, City Hall, engr.

Calif., Los Angeles — Bd. Supervs., Los Angeles Co. Hall of Records, 4.32 mi. sanitary sewer, Clara St., etc., C.I.1087. $98,700. A. Jones, Hall of Records, engr.

†Ill., Nameoki—Village c/o Clerk and Leroy Larsh, pres. Village Bd. Trustees, various sized, etc., sanitary sewerage sys. $64,000. FWA. Sheppard, Morgan & Schwaab, Faulstick Bldg., Alton, engr. CD 5/1—ENR 5/3.

La., Denham Springs—Town, sewer facilities. $70,000. Barnard & Burk, Triad Bldg., Baton Rouge, engrs.

Mass., Ludlow—Town, P. R. Baird, 182 North St., sanitary sewers, $65,000.

O., Columbus—Bd. Comrs. Franklin Co., bids soon 10,346 ft. 27- to 33-in. sewer extens. from city limits west to site of Fisher Body Co. plant at Georgesville Rd. and W. Broad St. $100,000. A. C. Slade, Court House, co. engr. Jennings-Lawrence Co., 12 N. 3 St., engrs. CD 1/18—ENR 1/25.

O., Xenia—City, brick, steel, concrete incinerator. $42,000. R. T. Parrish, N. B. Bldg., Dayton, engr.

Tex., Fort Worth—City, drainage N. Main St. $95,000.

Tex., Houston—City, sanitary sewer lateral line, $25,000.

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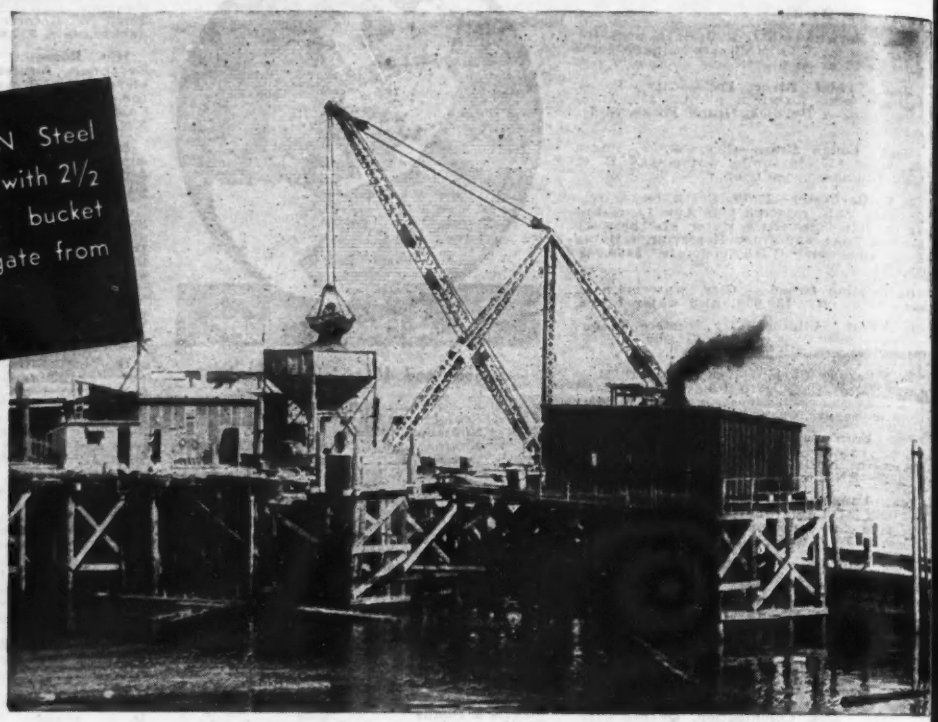

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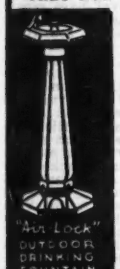
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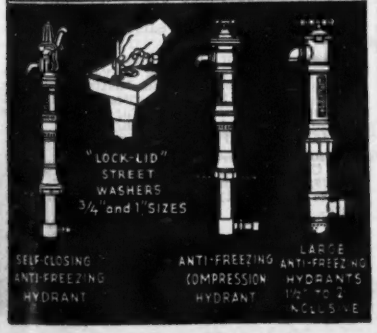
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SEWERS, WASTE DISPOSAL (Proposed Work, Cont'd.)

†**Wash., Seattle**—Roxbury Heights Sewer Dist., c/o J. P. Sylvester, Hoge Bldg., 2 and Cherry Sts., Zone 4, sanitary sewerage sys. and disposal plant. $100,000. **FWA.** Parker & Hill, Smith Tower, 2 Ave. and Yesler Way, Zone 4, engrs.

Alaska, Anchorage—City, City Hall, exten. sanitary sewerage sys. $47,000. H. M. Reherd, City Hall, acting city engr.

Ont., Sebringville—Ellice Twp., J. J. Brown, clk., R. R. 1, drainage East Black Creek. $29,000. W. G. McGeorge, County Bldg., Chatham, engr.

Sask., Swift Current—Municipality, incinerator; 2 mi. sewer extens., $50,000. V. E. Thierman, City Hall, engr.

BIDS ASKED

Bids Asked May 24

Ill., Chicago—Sanitary Dist. of Chicago, 910 S. Michigan Ave., furnishing, installing ignition equip. at Southwest Sewage Tr. Works, Contr. 45-16- (SW-M); furnishing, del., installing transformers, Div. 1, six 1,000 kva, 12,000 to 2,300 volt power, Div. 2, bidders shall quote a lump sum price to be allowed Sanitary Dist. for six 500 kva power transformers to be removed.

Tex., Stratford—City, J. R. Pendleton, mayor, sanitary sewerage sys., disposal plant. Plans deposit $25. F. E. Devlin, 2608 E. Kellog St., Wichita, engr.

Bids Asked May 28

Pa., Phila.—City Dpt. P. Wks., City Hall, sewers.

Bids Asked June 1

Okla., Goodwell—State Bd. Agriculture, State Capitol, Oklahoma City, sewage disposal plant and collecting sys. at A & M branch college. $25,000. Alexander & Pollard, Terminal Bldg., Oklahoma City, engrs.

Tex., Gongales—City, c/o G. C. Sydler, mayor, sewage disposal plant, incl. pump. sta., primary settling tank, 1 rock filter, final settling tank, sludge digestion tank, 2 sludge pits. Garrett Engrg. Co., 1806 Milan St., Houston, engrs.

Calif., Los Angeles—City Bd. P. Wks., City Hall, Central Outfall Sewer Ventilation Station 11 at South Screening Plant, Hyperion. Over $25,000. L. Aldrich, City Hall, engr.

LOW BIDDERS

Calif., Los Angeles — Bd. Supervs. Los Angeles Co., Hall of Records, May 8, sanitary sewers in Lavinia Ave., etc., from J. L. Kruly, 1785 N. Eastern Ave., **$40,834.** Est. $47,600. CD 3/15—ENR 3/22.

Calif., Santa Cruz—Santa Cruz Co., Court House, May 7, Twin Lakes Sanitary Dist., from J. L. Kruly, 1785 N. Eastern Ave., Los Angeles, **$89,965.** CD 4/16—ENR 4/19.

D. C., Wash.—District Comrs., District Bldg., May 8, Suburban Heights stormwater sewer, south section, 51 St. and Hayes St. S.E., from Intercounty Constr. Co., Hyattsville, Md., **$34,050.** CD 5/1—ENR 5/3.

†**D. C., Wash.**—District Comrs., District Bldg., May 11, Trenton Terrace stormwater sewers, vicinity of 13 St. and Massachusetts Ave. S.E., D. C., 49-186-N, from Walter B. Freeman & Son, Temple Hills, Md., **$27,866. FWA.**

Ill., Chicago—Sanitary Dist. of Chicago, 910 S. Michigan Ave., May 10, swing diffuser sys., Southwest Sewage Tr. Works, Contr. 45-22 (SW-P), from L. H. Prentice Co., 1048 W. Van Buren St., **$53,500.** CD 5/4.

†**Mass., Camp Edwards**—U. S. Eng., 31 St. James St., Boston, Zone 16, May 8, drainage imprvs., Spec. 19-023-45-Neg-126, from Berke-Moore Co., Inc., 11 Boylston St., Brookline, **$188,170.**

†**Tex., Houston**—Federal Works Agency, 311 U. S. Appraisers Store Bldg., 7300 Wingate St., May 3, sewer service, Greens Bayou, Market St. road area, Tex. 41-664-F, Contr. 2, from C. W. George, Market Street Rd., **$39,539.** CD 4/24—ENR 4/26.

CONTRACTS AWARDED

Calif., Los Angeles—City Bd. P. Wks., City Hall, May 9, sanitary sewers in Davan Rd. and Murietta Ave., to V. C. K. Constr. Co., 629 S. Atlantic Blvd., **$31,998.** Est. $29,666. CD 4/25—ENR 5/3.

†**Okla., McAlester**—City, City Hall, sanitary sewer lines, facilities, Okla. 34-204, to H. J. Happel, Barnes Bldg., Muskogee, **$90,238. FWA.** CD 4/19.

Va., Richmond—At office J. W. Huffman, city purch. agt., 219 Governor St., combined sanitary and storm sewers, serving Montrose Heights sect., to McLane Constr. Co., 1015 N. 6 St., **$83,877.** Bids 5/8. CD 4/20—ENR 4/26.

BRIDGES

PROPOSED WORK

Calif., Alpine—San Diego Co., Civic Center Bldg., San Diego, 2 bridges over Sweetwater River, near here. $45,000. County Engineer, Civic Center Bldg., San Diego, engr.

Ia., Carroll—Bd. Supervs. Carroll Co., bridges, and culverts **$5,800.** J. F. Maher, Carroll, co. engr.

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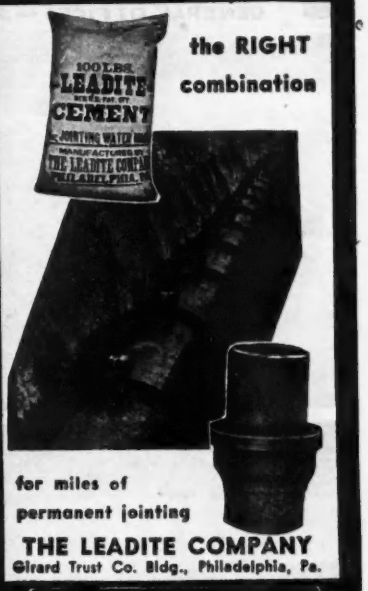

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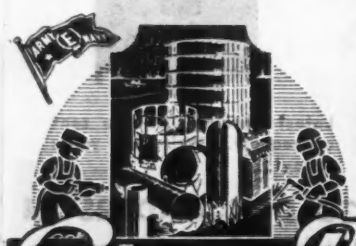

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BRIDGES (Proposed Work, Cont'd.)

Ia., Eldora—Bd. Supervs. Hardin Co., bridges, culverts. $8,700. R. T. Johnson, Eldora, co. engr.

Ia., Spencer—Bd. Supervs. Clay Co., bridges, $7,146. F. Campbell, Spencer, co. engr.

BIDS ASKED

Bids Asked May 21

Mass., Boston—City, P. Wks. Dpt., City Hall Annex, construction work, Sprague St. bridge over New York, New Haven & Hartford R.R., Hyde Park. $30,000. Plans deposit $2.

Bids Asked May 25

Vt., Newfane—State, Dpt. Hys., Montpelier, 69 ft. span steel frame bridge with concrete floor and double tack coat refined tar approaches, approx. $25,000.

Bids Asked May 29

Washington—State Hy. Dpt., C. E. Hickey, dir., Olympia, 63 ft. rein.-con., steel girder bridge over Rock Creek on Primary State Hy. 8, and grading 0.483 mi. approaches, Klickitat Co. Plans deposit $2.

CONTRACTS AWARDED

Alabama—State Hy. Dpt., Montgomery, 489 ft. bridge, Talladega Co., to Pitt Douglas & Co., Anniston, $56,720. Bids 5/4. CD 4/25—ENR 5/3.

N. Y., Jamestown—City, Dpt. P. Wks., City Hall, repairing, reconstructing 8 bridges, to E. H. Wood Co., 505 Delaware Ave., Buffalo. $30,000. Est. $35,000. Awarded 5/7. CD 11/21—ENR 11/30.

West Virginia—State Rd. Comn., Charleston, imprv. Bridges 1167, 1172 and 1182, Putnam Co., to Kanawha Constr. Co., 310 Monroe Ave., South Charleston, $38,003. Bids 5/1. CD 4/23—ENR 4/26.

STREETS AND ROADS

BIDS ASKED

Bids Asked May 21

New Jersey—State Hy. Dpt., S. Miller, Jr., comr., Trenton, 0.681 mi. Access Road to Industrial Storage Depot, in cities of Rahway and Linden, Fed. Proj. DA-WI-21, Union Co. Plans deposit $10.

Bids Asked May 22

Mass., Attleboro—City, Bd. P. Wks., City Hall, 8,300 sq. yd. granolithic sidewalks, 2,300 lin. ft. granite curbing, curved granite curbing and corners, resetting 4,500 lin. ft. granite curbing. $25,000.

Bids Asked May 23

O., Elyria—Bd. Comrs. Lorain Co., resurfacing, spot oiling and patching 30 mi. various county hys. $59,540. D. E. Patterson, Court House, co. engr.

Bids Asked May 29

California—State Div. Hys., Sacramento, plant mix surfacing 8.5 mi. hy. between Isleton and Sacramento, Sacramento Co.; penetration treating and gravel base repairing 9.4 mi. hy. between Madison and 2½ mi. south of Dunnigan Yolo Co.; scarifying, reshaping existing surfacing and base, constructing crusher run base, placing plant mix surfacing 3 mi. portions of hy. between Beltane and Agua Caliente, Sonoma Co.; furnishing, placing imported base material and applying armor coat thereto on 2.9 mi. hy. between Longvale and Laytonville, Mendocino Co.; plant mix on crusher run surfacing, stockpiling plant mix surfacing material 3.4 mi. portions hy. between Truckee and Farad, Nevada Co.; Class A-medium seal coat surfacing about 14.8 mi. hy. between point 4 mi. north of Weed and Oregon State Line, Siskiyou Co.; plant mix surfacing on existing roadbed, constructing imported borrow borders on 12.2 mi. hy. between Sutters Bypass and Tudor Rd., Sutter and Yuba Counties; plant mix asphalt surfacing on existing roadbed and on new crusher run base 4.8 mi. hy. between North Sacramento and about 2 mi. easterly and between 1 mi. east of Davis and Swingle, Sacramento and Yolo Counties; plant mix on existing roadbed surfacing, repairing, and constructing imported borrow shoulders on portions 8.3 mi. hy. between Davis Wye Willow Slough and between Cache Creek and 3 mi. north and between Woodland and 1.3 mi. north in Yolo Co. G. T. McCoy, Sacramento, state hy. engr.

Kentucky—Dpt. Hys., Frankfort, bituminous surfacing, resurfacing driveways within grounds of Feeble Minded Institute, Frankfort; Eastern State Hospital, Lexington; Houses of Reform, Greendale; Western State Hospital, Hopkinsville; Children's Home, Lyndon; Central State Hospital, Lakeland.

Pennsylvania—J. U. Shroyer, secy., State Hy. Comn., Harrisburg, bituminous surfacing 29,507 ft., Route Legislative R-187, Sects. 2A(R) & 2b(R), Traffic R-22, Churchill Boro, Wilkins, Penn and Patton Twps., Allegheny Co.; 5,795 ft., Route Legislative R-805, Sect. R, Shaler and Ross Twps., Allegheny Co.; 19,090 ft., Leg. Rt. 11009, Sect. 4, Leg. Rt. 11014, Sect. 1, Leg. Rt. 11070, Sect. 2, Leg. Rt. 11021, Sect. 2, Tr. Rt. 160, Summerhill, Croyle and East Taylor Twps., Cambria Co., widening paving, etc., 26,260 ft., Cambridge Springs

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STREETS and ROADS (Bids Asked, Cont'd.)

Boro, City of Meadville, Cambridge, West Mead, Sadsbury and Summit Twps., Crawford Co.: rein.-con. paving 12,284 ft., Leg. R-538, Sect. W, Traffic R-30, Greene Twp., Beaver Co.; bituminous surfacing existing concrete bridge floor 6,662 ft., Route Leg. R-128, Sect. 1, Traffic R-30, Wrightsville and Columbia Boros, York and Lancaster Counties.

Washington—State Hy. Dpt., Olympia, C. E. Hickey, dir., surfacing, stockpiling 17.9 mi. Primary State Hy. 3, from top of Asotin Hill to State Park, Asotin Co.; manufacturing, stockpiling crushed stone surfacing and mineral aggregates on Primary State Hys. 14 and 21, and Secondary State Hys. 21-A and 21-B, Port Orchard to Gig Harbor, Kitsap and Pierce Counties. Plans deposit $2 each.

Wisconsin—State Hy. Comn., Madison, bituminous surfacing 9.185 mi. U. S. Hy. 12, Black River Falls-Augusta-Eau Claire Rd., Augusta-Fairchild-East Co. line Rd., FAP. SN-A-FAP 395-E(3), Eau Claire Co.

Bids Asked May 31

Ia., Burlington—Bd. Supervs. Des Moines Co., Burlington, resurfacing 80.7 mi. secondary roads, involving crushing, hauling $2,275 cu. yd. Class A crushed stone on road. F. W. Inghram, Burlington, co. engr.

Bids Asked June 1

Louisiana—State Hy. Dpt., Baton Rouge, shaping roadway, gravel surfacing, culverts, bridges 103.7 mi. Defense Access Army Reservation Proj. No. DA-WR 500 (2), S.P. 737-00-31, Vernon Parish; 63.9 mi. Defense Access Army Reservation Proj. No. DA-WR 500 (2), S.P. 737-00-30, Sabine Parish; 141 mi. Defense Access Army Reservation Project DA-WR 500 (2), S.P. 737-00-26, Beauregard Parish; 99.4 mi. Defense Access Army Reservation Project No. DA-WR 500 (2), S.P. 737-00-25, Allen Parish; 14.74 mi. Oakdale Vidrine Hy., S.P. 66-06-04, Evangeline Parish.

Bids Asked June 19

†N. Y., New York—Veterans Admin., Vermont Ave. between H and I Sts. N.W., Wash. 25, D. C., resurfacing roads.

Bids Asked

Tennessee—State Hy. Dpt., Nashville, rejected bids Apr. 27, imprv. 5.498 mi. Hy. 61; 6.772 mi. State Hy. 9, both Anderson Co. CD 5/1—ENR 5/3, under LB.

Texas—State Hy. Comn., Austin, rejected bids May 2, imprv. 7.646 mi. hy. Hale Co. CD 5/7—ENR 5/10, under LB.

Tex., Lamarque—Lamarque Developing Co. (City of Lamarque), Lamarque, award not made for asphalt street paving. CD 3/7—ENR 3/15 under LB.

LOW BIDDERS

California—State Div. Hys., Sacramento, May 3, repairing 13.4 mi. Imperial Co., from N. I. Fadel, 7101 Radford Ave., North Hollywood, **$115,650.** CD 4/16—ENR 4/19.

California—State Div. Highways, Sacramento, May 9, imprv. 2.6 mi. Butte Co., from E. B. Bishop, Orland, **$26,261;** 7.5 mi. Humboldt Co., from Mercer Frazer Co., 2 and Commercial Sts., Eureka, **$170,983.** CD 4/20—ENR 4/26.

Calif., Los Angeles—Los Angeles Co., Hall of Records, Los Angeles, May 8, imprv. Clark and Cerritos Aves., Contr. 556, from Vido Kovacevich, 5400 Imperial Hy., South Gate, **$65,022.** CD 4/23—ENR 4/26.

D. C., Wash.—District Comrs., District Bldg., May 11, about 12,500 sq. yd. concrete sidewalks, from Corson & Gruman Co., 33 and K Sts. N.W., **$39,540.**

★**Kentucky**—State Dpt. Hys., Frankfort, May 11, imprv. 7.089 mi. Carter Co. and 42.529 mi. Anderson, Shelby and Spencer Counties, from R. M. Robinson, Owensboro, **$43,681** and **$109,729** respectively•••7.938 mi. Floyd Co., from R. B. Tyler, 1447 Levering St., Louisville, **$48,188**•••9.439 mi. Rowan Co., from Gay-Coleman Constr. Co., 113 Cheapside St., Lexington, **$44,316**•••17.169 mi., Russell Co., from R. E. Gaddie & Co., Bowling Green, **$121,206**•••24.7 mi. Bracken-Campbell and Kenton Counties from Eaton Oil Wks., Covington, **$52,870**•••33.234 mi. Henry and Shelby Counties, from Middle West Roads Co., Noblesville, Ind., **$142,349**•••12.64 mi., Boone, Kenton and Grant Counties, from H. K. Williams, 1327 S. 7 St., Louisville, **$86,485**•••21.242 mi. Knox, Laurel and Whitley Counties from Lyons & Breeden, Rogersville, Tenn., **$33,105.** CD 4/24—ENR 4/26.

†Maryland — Pub. Roads Admin., 1440 Columbia Pike, Arlington, Va., May 8, access road to Indian Head Naval Reservation, Proj. Md-DA-NR-4-E(3), Prince Georges Co., from Segriti Constr. Co., 6040 River Rd., Wash. 16, D. C. **$52,690.** CD 5/1—ENR 5/3.

Md., Baltimore—City, c/o Bd. Awards, City Hall, May 10, concrete paving various streets, Contr. C.C. 793, from Arundel Constr. Co., 910 Trinity St., **$29,179.**

Mass., Boston—City, Dpt. P. Wks., City Hall, May 11, bituminous concrete paving, Buttonwood St., etc., from S. J. Tomasello Corp., 25 Huntington Ave., **$31,301.** CD 5/4.

★**Tennessee**—State Hy. Dpt., Nashville, May 11, imprv. 21.5 mi. Coffee and Warren Counties, from Stacy Bros. Co., Johnson City, **$120,774**•••27.6 mi. Stewart and Montgomery Counties and 12.1 mi. Cocke Co. from J. B. Michael & Co., 14[illegible] Haywood St., Memphis, **$126,487** and **$[illegible]** respectively •••35.6 mi. Perry and Hickman Counties from Memphis Stone & Gravel Co., Exchange Bldg., Memphis, **$188,746**•••9 mi. Sumner Co. and 19.2 mi. Jackson and Clay Counties, from R. B. Tyler Co., 1446 Levering St., Louisville, Ky. **$37,238** and **$115,884** respectively•••7.9 mi. Morgan Co., from Harrison Constr. Co., 1101 Western Ave., Pittsburgh, Pa., **$28,387**•••19.9 mi. De Kalb and Putnam Counties, from Hardaway Contr. Co., 15-11 St., Columbus, Ga., **$146,748.** CD 4/24—ENR 4/26.

Wash., Seattle—City, Bd. P. Wks., County-City Bldg., 3 and James Sts., Zone 4, May 10, concrete paving 23,640 sq. yd. Waters Ave., etc., from Fiorito Bros., 100 Leary Way, Zone 7, **$71,955.** Est. $84,136. C. L. Wartelle, city engr. CD 5/2.

CONTRACTS AWARDED

†Fla., MacDill Field (br. Tampa)—U. S. Eng., Post Office Bldg., Savannah, Ga., grading, paving for accelerated traffic tests, to L. J. and W. L. Cobb Inc., 1102 22 St., Tampa, **$32,715.**

Ia., Denison—Crawford Co., maintenance surfacing various secondary roads, to J. Schumacher, Irvington, **$61,350.** Bids 5/4. W. J. Wearmouth, Denison, co. engr.

Ia., Sigourney — Keokuk Co., surfacing various secondary roads, to Kaser Constr. Co., Adel, **$79,800.** Bids 5/3. CD 4/23—ENR 4/26.

Ia., Waverly—Bd. Supervs. Bremer Co., grading 39 mi. various secondary roads, involving 507,000 cu. yd. class 2 and 2A earth excv., to Lowe Constr. Co., 417 1 Ave. S.E., Cedar Rapids, **$58,305.** Awarded 5/7. W. S. Chapman, Waverly, co. engr.

Kansas—State Hy. Dpt., Syracuse, imprv. 11.314 mi. Hamilton Co., to Brace Constr. Co., Dodge City, **$33,062.** Bids 4/25. Rejected bids May 25, imprv. 15.2 mi. Wichita Co. CD 4/13—ENR 4/19.

Mass., Boston—City, Dpt. P. Wks., [illegible] City Hall Annex, imprv. Lennoco Rd., Burnham, Flavia, Mattapan and Commercial Sts., in Mattapan, to Baker & Co., 1335 Hyde Park Ave., Hyde Park, **$24,564.** Bids 5/4, awarded 5/7. CD 4/26.

New Mexico—State Hy. Dpt., Santa Fe, imprv. 5.4 mi. McKinley Co., to J. E. Skoogsen, Springer Bldg., Albuquerque, **$322,458.** Bids 5/11. CD 5/11—ENR 5/3.

O., Cincinnati—H. F. Wagner, city purch. agt., resurfacing approx. 1,250,000 sq. yd. various streets, to Central Ohio Road Constr. Co., 13 E. Corry St., **$80,725.** Bids 4/17. H. H. Krang, City Hall, city engr.

Pennsylvania — Dpt. Hys., Harrisburg, bituminous resurfacing 2.32 mi. Traffic Route 718, Sharon and Farrell, Mercer Co., to Johnson & McIntyre, Sharon, **$35,213**••• 1.6 mi. U.S. Rt. 422, Traffic Rts. 18, 168, and 224, from New Castle to Ohio state line, Mahoning Twp., Lawrence Co., to Kelley & Meyer Co., Dollar Bank Bldg., Youngstown, O., **$35,178**•••5.5 mi. U.S. Rt. 22, between Santiago and Ohio state line, Hanover and Robinson Twps., Washington Co., to Tri-State Asphalt Corp., S. Bway., Martins Ferry, O., **$94,419.** Grand total $164,810. Bids 5/11.

Tex., San Antonio—City, City Hall, widening, asphalt paving West Ave., to Kelly Constr. Co., 2215 Belknap Pl., **$36,540.** T. Coghill, City Hall, engr.

West Virginia—State Road Comn., Charleston, imprv. 8.75 mi. Tyler Co., to H. E. Calvin, Dime Savings Bank, Marietta, O., **$[illegible]** 453•••9.1 mi. Proj. 5018 and 11.0 mi. Proj. 13 and 5239, Wyoming Co., to A. A. Bostic, Rupert, **$32,593** and **$41,165** respectively••• 28.73 mi. Calhoun Co., to L. C. Hanna, [illegible] Marianna St., Charleston, **$58,016**••• 16.[illegible] mi. Braxton Co., to Fuccy Bros., Weston, **$28,084**••• 13.6 mi. Morgan Co. to Potomac Constr. Co., Martinsburg, **$41,698**•••14 mi. Cabell Co., to Middle State Bituminous Corp., Ashland, Ky., **$40,280.** Grand total $271,293. Bids May 1. Rejected bids May 1, imprv. 37.95 mi. Hardy Co. CD 4/23—ENR 4/26.

Ont., Port Arthur—Municipality, concrete sidewalks, day labor, **$24,746.**

Ont., Sturgeon Falls—Municipality, A. P. Allaire, clk., Sturgeon Falls, gravel resurfacing about 20 mi. streets, day labor. Over **$30,000.**

EARTHWORK, WATERWAYS

PROPOSED WORK

Calif., Los Angeles—Los Angeles Co. Flood Control Div., 751 S. Figueroa St., rein.-con. or gunite facing upstream side of San Gabriel Dam 2. $150,000. H. E. Hedger, 751 S. Figueroa St., engr.

★**Neb., Grand Island**—Mid-State Public Power & Irrigation Dist., H. Grimminger, dir., Grand Island, dam on Platte River, power plant, transmission lines, irrigation, $14,000,000.

†Utah, Newton—Bureau Reclamation, Denver, Colo., prepared plans highline canals on Newton Irr. Proj. $30,000.

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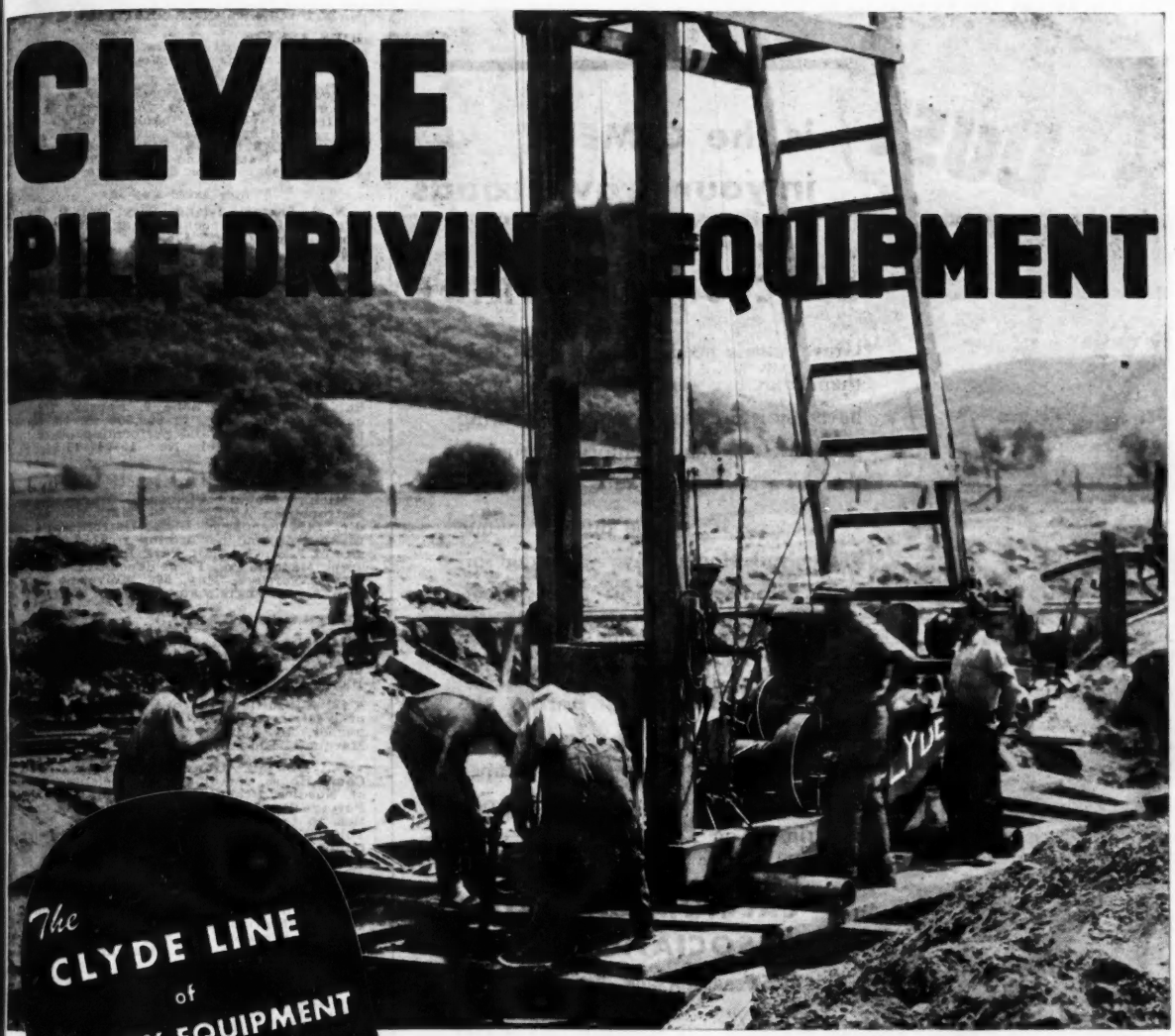

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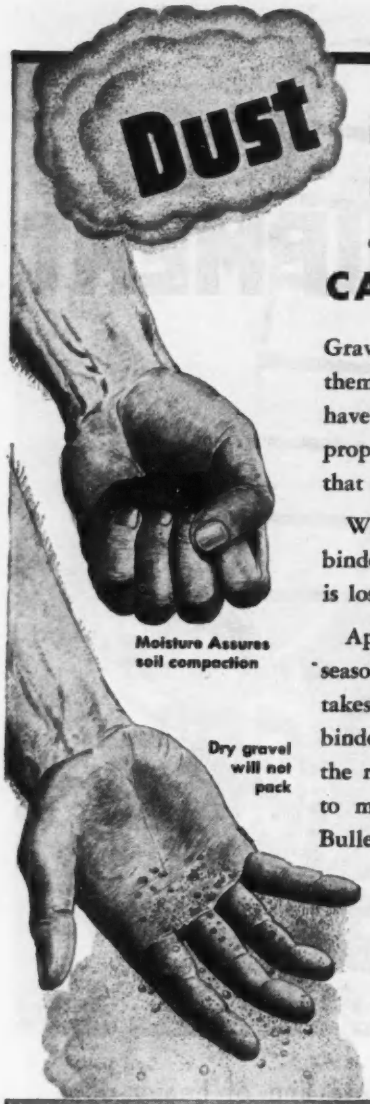

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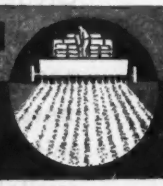

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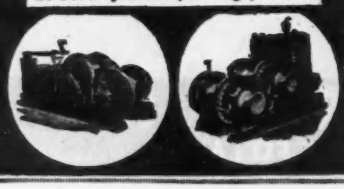

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EARTHWORK, WATERWAYS (Cont'd.)

BIDS ASKED

Bids Asked May 26

O., Findlay—At office, J. M. Stough, engr. Hancock Co., Findlay, clearing, grubbing, tree removal, 146,385 cu. yd. channel excav., 107,160 cu. yd. spoil bank leveling, 1,400 cu. yd. old spoil bank leveling, relocating 140 lin. ft. 8 in. drain tile, McComb Main Ditch, W. Hutson and H. B. Thomas, laterals, $45,209. Plans deposit $10.

Bids Asked May 30

N. S., Scatarie Island—Secy. Dpt. P. Wks., Ottawa, Ont., reconstructing breakwater, North West Cove. $75,000. Plans deposit $20.

Bids Asked About June 1

★**†California**—U. S. Eng., 751 S. Figueroa St., Los Angeles, Zone 55, 1st section (approx. ½) of Lytle Creek Channel, Warm Creek to Foothill Blvd., 1,181,000 cu. yd. excav., 624,000 cu. yd. fill, 146,000 cu. yd. concrete, etc., San Bernardino Co. $4,000,000.

Bids Asked June 4

†Louisiana—U. S. Eng., foot of Prytania St., New Orleans, Zone 9, approx. 700,000 cu. yd. uncompacted or 600,000 cu. yd. compacted earthwork and performing other incidental work, Sol. No. 16-047-45-84, St. Johns Parish.

Bids Asked June 5

Mich., Mount Clemens—Huron-Clinton Metropolitan Auth., G. W. McCordic, engr.-dir., 2456 Penobscot Bldg., Detroit, Zone 26, making fill and performing related work at site of Lake St. Clair Park Project Harrison Twp., Macomb Co. Plans deposit $10. Ayres, Lewis, Norris & May, 506 Wolverine Bldg., Ann Arbor, engrs.; adv. ENR 5/17.

CONTRACTS AWARDED

Ia., Nevada—Bd. Superva. Story Co., Nevada, constructing Palestine Drainage Dist. 115, to J. D. Armstrong Co., Ames, $20,246. Bids 4/26. CD 4/11—ENR 4/19.

†Miss., Gulfport—U. S. Eng., Grant St. west of Westwood St., Mobile 7, Ala., dredging in harbor, to Sternberg Dredging Co., Pere Marquette Bldg., New Orleans, La., $55,800.

O., Bowling Green—Comrs. Wood Co., Court House, cleaning, imprv. sloping banks of Needles Branch and Middle Branch of Portage River, in Wood and Hancock Counties, to Launder & Son, Inc., Sta. E, Box 6, Toledo, $81,251. Est. $69,000. M. Stringfellow, Findlay, co. engr. Hancock Co. M. Berry, Bowling Green, co. engr. Wood Co. Awarded 5/1.

Pennsylvania—Commonwealth of Pennsylvania, c/o State Water & Power Resources Bd., rectification, imprv. Lackawanna River channel, Scranton and Taylor Boro, Lackawanna Co., to A. W. Hinaman, Williamsport, $110,456.

Wash., Wenatchee—Wenatchee Reclamation Dist., 6 N. Mission St., W. C. Penhallegon, dist. secy., 970 ft. 5 x 3½ ft. rein.-con. box, 3,270 ft. 5 x 3½ ft. concrete lined canal, 50 ft. 5 x 4 ft. rein.-con. culvert box and 30 ft. 10 x 3½ ft. concrete lined canal, to Beal & Roberts, Republic Bldg., 3 and Pike Sts., Seattle, Zone 1, $28,675. Bids 5/10.

LATIN AMERICA

Mexico—State of Guanajuato, Ernesto Hidalgo, gov., Capital City, Leon, will construct and repair all state roads, by own forces, $600,000.

Mexico—State of Guanajuato, Ernesto Hidalgo, gov., Capital City, Leon, will construct and repair water sys. and sewerage-drainage in entire state, by own forces, $750,000.

Mexico—State of Michoacan, Capital City, Morelia, plans schools and repairs. $850,000.

Panama, Panama City—Dpt. P. Wks., R. Chiari, minister, design, engineering construction and inspection airport, 3 story, 625 ft. long concrete terminal, clearing, grading, to F. H. McGraw & Co., 51 E. 42 St., New York, N. Y., $7,000,000. CD 3/9—ENR 3/15.

PUBLIC BUILDINGS

PROPOSED WORK

†Calif., Berkeley—Pub. Housing Auth., NHA, Phelan Bldg., San Francisco, plans by Confer, Ponsford & Barovetto, 1214 Webster St., Oakland, 126 temporary family dwelling units, Calif. 4032N; 110 unit temporary family dwellings, Calif. 4032N.

†Calif., El Centro—Pub. Housing Auth., NHA, 760 Market St., San Francisco, plans by G. Stanley Wilson, 3681 6 St., Riverside, 72 family trailers, utilities, Calif. 4048; 72 family trailers, utilities, Calif. 4059. CD 3/15—ENR 3/22.

PUBLIC BUILDINGS (Proposed Work, Cont'd.)

†**Calif., Hornitos**—Pub. Housing Auth., NHA, 760 Market St., San Francisco, 20 single person stopgaps, Calif. 4145.

†**Calif., Los Angeles**—Pub. Housing Auth., NHA, 760 Market St., San Francisco, plans by A. Monaco, 2721 Lakewood Ave., 100 family trailers with utilities, Calif. 4140.

†**Calif., Oxnard**—Pub. Housing Auth., NHA, 760 Market St., San Francisco, 250 family units, Calif. 4144.

★†**Calif., Santa Maria**—Bell Oil & Refining Co., 621 S. Hope St., Los Angeles, carbon black producing plant, $750,000. Defense Plant Corp. will finance.

Calif., Walnut Creek—Walnut Creek Grammar School Dist., Frederick and Locust Sts., voted $162,000 bonds, rein.-con. classroom addn. to school. Dragon & Schmidts, 2068 Allston Way, Berkeley, archts. CD 3/19—ENR 3/22.

†**Colo., Denver**—U. S. Eng., 909 17 St., Denver, permanent type patients mess, $130,000.

La., Lake Charles—H. A. Norton, supt. Schools, Calcasiau Parish, plans by Dunn & Quinn, Lake Charles, high school and 2 classroom addn., school, $280,000. Applied for FWA funds.

†**Md., Aberdeen Proving Grounds**—U. S. Eng., Standard Oil Bldg., Baltimore, Zone 2, 1 story, brick ballistics research laboratory addn. $354,000. Eggley Engineers, 1500 Walnut St., Phila., Pa., engrs.

Mass., Ludlow—Town, P. R. Baird, 182 North St., brick recreation bldg. $45,000.

†**Mich., Grand Rapids**—Doehler-Jarvis Co., Grand Rapids, preparing plans, brick, steel, concrete power plant, $100,000. Defense Plant Corp. will finance. Farrell & White, 409 Griswold St., Detroit, engrs.

N. C., Jacksonville—Bd. Educ. Onslow Co., A. H. Hatsell, supt., Jacksonville, rejected bids May 7, addns. to Dixon, White Oak and Swansboro Schools. Will readvertise. A. J. Maxwell, Jr., Goldsboro, archt. CD 5/1.

†**N. Y., New York**—Veterans Admin., Vermont Ave. between H and I Sts. N.W., Wash. 25, D. C., indefinitely postponed bids to have been opened June 12, Laundry Bldg. 7 alterations, addns. CD 5/8—ENR 5/10.

O., Shelby—City, municipal light plant expansion incl. addnl. boiler, $275,000. J. P. Atkins, city engr. CD 4/23—ENR 4/26.

†**Ore., Cottage Grove**—Pub. Housing Auth., NHA, Skinner Bldg., 5 and Union Sts., Seattle 1, Wash., 40 family dwelling units, Ore. 35320. $100,000.

†**Ore., Scottsburg**—Pub. Housing Auth., NHA, Skinner Bldg., 5 Ave. and Union St., Seattle 1, Wash., plans by Whitehouse, Church, Newberry & Roehr, Ry. Exchange Bldg., Portland, 20 portable family dwelling units, Ore. 35317. $40,000. CD 5/2—ENR 5/10, under Reedsport.

†**Pa., Boothwyn**—School Bd. of Upper Chichester, Boothwyn, plans by L. P. MacKenzie, 112 S. 16 St., Phila., school addn. $40,000. FWA.

†**Pa., Phila.**—U. S. Eng., Standard Oil Bldg., Baltimore 2, Md., bids soon powder storage magazine at Frankford Arsenal.

★†**Pa., Pittsburgh** — Pittsburgh Housing Auth., Administration Bldg., Kirkpatrick and Bentley Sts., approved bond proceedings developing housing. $5,610,000; housing, $4,999,000.

†**Tex., Fort Sam Houston**—U. S. Eng., Fort Sam Houston, converting barracks Bldgs. 275 and 276 in general hospital, Ser. W-41-154-45-137. $150,000.

★†**Tex., Fort Sam Houston**—U. S. Eng., Fort Sam Houston, addnl. bldg. conversion into hospital units, $2,500,000.

†**Tex., Greenville**—U. S. Eng., 606 Santa Fe Bldg., Galveston, storage magazines at Majors Field, $25,000.

†**Tex., McGregor**—U. S. Eng., 606 Santa Fe Bldg., Galveston, 6 rein.-con. sumps at Bluebonnet Ordnance Plant. Over $40,000.

†**Tex., Texarkana**—U. S. Eng., 231 W. Main St., Denison, change house and clock alley facilities incl. bldgs., drainage, utilities, surfacing, etc., Ser. 34-066-45-38. $150,000.

★†**Wash., Poulsbo**—Pub. Housing Auth., NHA, Skinner Bldg., 5 and Union Sts., Seattle, Zone 1, plans by J. W. Taylor, Arcade Bldg., 2 and Union Sts., Seattle, Zone 1, 160, family dwelling units, Wash. 45325, $450,000; 108 dormitory housing units, Wash. 45324, $150,000.

†**Wash., Seattle**—Pub. Housing Auth., NHA, Skinner Bldg., 5 and Union Sts., Zone 1, plans by J. L. Holmes, Old Times Bldg., Zone 1, 200 dormitory units and service bldg., Wash. 45328. $180,000. CD 5/1—ENR 5/3.

★†**Wash., Seattle**—Pub. Housing Auth., NHA, Skinner Bldg., 5 and Union Sts., Seattle, Zone 1, plans by Stuart & Durham, 4th and Cherry Bldg., Zone 4, 250 portable frame dwelling units, Wash. 45327, $500,000; plans by Morrison & Jacobsen, 719 2 Ave., Zone 4, 150 portable frame dwelling units, Wash. 45330, $300,000.

★†**Wash., Seattle**—Veterans Admin., Vermont Ave. between H and I Sts. N.W., Wash. 25, D. C., 10 story hospital, Beacon Ave. and Columbia Way, $2,500,000.

Wash., Spokane—School Dist. 81, 503 4 St., plans by Geo. M. Rasque & Son, Washington Trust Bldg., 1 story Finch Grade School. $200,000. Seeking FWA funds.

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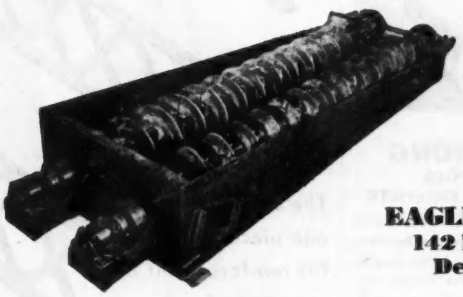

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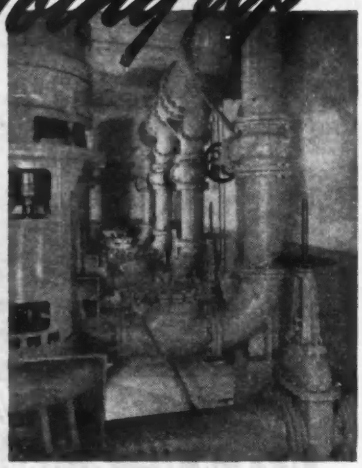
Ralph P. Hall, Inc., Boston, Subcontractors for Installation



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PUBLIC BUILDINGS (Proposed Work, Cont'd.)

Que., Shawinigan Falls—City, plans by A. LaCoursiere, 101 4 St., city hall, Cedres and 5 Sts. About $250,000.

BIDS ASKED

Bids Asked May 22

†**N. C., Raleigh**—Raleigh State Hospital, R. P. Pierce, bus. mgr., Raleigh, altering R-S-T Ward and X-Ward Bldg. Northrup & O'Brien, Winston-Salem, archts.

Bids Asked May 23

†**N. Y., New York**—Pub. Bldgs., Admin., 731 Custom House, Zone 4, altering 2 and 4 floors bldg., 252 7th Ave.

Pa., Danville—Commonwealth of Pennsylvania, c/o C. M. Woolworth, secy. Dpt. Property & Supplies, Harrisburg, cold storage plant and slaughter house addns., alterations, Farm Colony Group 1, and 2 propagating houses. Plans deposit $2.50. D. S. Readinger, 1450 N. Front St., Harrisburg, archt.

Pa., Mayview—Commonwealth of Pennsylvania, c/o C. M. Woolworth, secy. Property & Supplies, Harrisburg, stair tower, revisions to plumbing and renovation electrical installations at Mayiew State Hospital. Plans deposit $2.50. C. M. and E. Stotz, Jr., 801 Bessemer Bldg., Pittsburgh, archts.

Bids Asked After May 24

†**Tex., Fort Sam Houston**—U. S. Eng., Fort Sam Houston, converting Barracks Bldg. 277, into general hospital, Ser. W-41-154-45-137. $150,000. CD 4/12—ENR 4/19.

Bids Asked May 25

†**Calif., Bakersfield**—Pub. Housing Auth., NHA, 760 Market St., San Francisco, 50 temporary family dwelling units, Calif. 4986. E. L. McCoy, 135 Hay Bldg., archt. CD 4/5—ENR 4/12.

†**Calif., San Francisco** — Pub. Housing Auth., NHA, 760 Market St., San Francisco, 146 family war dwelling units, Calif. 4073-N. W. P. Day, John Funk and D. P. Smith, 58 Sutter St., archts.

†**Ore., Portland**—Federal Works Agency, Alaska Bldg., 2 and Cherry Sts., Seattle 4, Wash., portable frame addns. to Portsmouth and Peninsula Schools, Ore. 35189-F. $98,000. Barrett & Logan, 1940 S.W. 4 St., archts.

Bids Asked May 28

Ga., Atlanta—City, c/o L. A. Walker, purch. agt., removing two 320 hp. boilers and furnishing, erecting complete in place one 760 hy. four drum tube boiler unit with fans, settings, etc.

Bids Asked May 29

†**Calif., Bakersfield**—Pub. Housing Auth., NHA, 760 Market St., San Francisco, 50 temporary family dwelling units, Calif. 4060. E. L. McCoy, 135 Hay Bldg., archt. CD 4/5—ENR 4/12.

Calif., Long Beach—City Gas Dpt., City Hall, complete compressor station, incl. auxiliaries, equipment, bldgs., etc., Cherry Ave. and 70 St., Spec. C-647. $215,000.

Ky., Ashland—State Dpt. Hys., Frankfort, brick, concrete Highway Garage Bldg. 293-A.

Bids Asked June 1

†**Ky., Paducah**—Pub. Bldgs. Admin., 18 and F Sts. N.W., Wash. 25, D. C., 1 story, part basmnt., masonry Health Center Bldg., Ky. 15-170. S. Lester Daly, 704 E. 5 St., Metropolis, Ill., archt. CD 5/1—ENR 5/3.

Bids Asked June 4

La., Alexandria—City, municipal abbatoir. M. J. Heinberg, Guaranty Bank Bldg., archts. CD 12/12—ENR 12/14.

Bids Asked June 5

La., New Orleans—Orleans Parish School Bd., Jennie Roch, secy., 703 Carondelet St., 1 story, annex on grounds of Gentilly Terrace School, fronting Carnot St. between Arts. Ave. and Painters Sts., etc. Plans deposit $5. E. A. Christy, 703 Caroldelet St., archt.

Bids Asked June 26

†**Nev., Reno**—Veterans Admin., Vermont Ave. between H and I Sts. N.W., Wash. 25, D. C., Main Bldg. 1, incl. roads, walks, paving, drainage, etc., Proj. 2470. CD 3/22—ENR 3/29.

LOW BIDDERS

★†**Calif., Hunters Point**—Pub. Housing Auth., NHA, 760 Market St., San Francisco, May 9, 224 family dwelling units, Calif. 4130, Area A, from Erbentraut & Summers, 446 6th St., San Francisco, **$542,300**; 50 temporary family dwelling units, Calif. 4137, from Moore & Roberts, 693 Mission St., San Francisco, **$191,538**. CD 5/1.

†**Calif., Riverside**—U. S. Eng., 751 S. Figueroa St., Los Angeles, Zone 55, May 10, medium security disciplinary barracks, etc., No. 282, from F. Pinkerton, 108 Southwest Blvd., Corona, **$181,903**.

†**Ga., Americus** — Reconstruction Finance Corp., H. L. Herrington, mgr., Hadley Bldg., Atlanta, May 7, 2 warehouses, from John A. Johnson Contrg., 268-41 St., Brooklyn 32, N. Y., **$108,697**. CD 5/1.

Ind., Franklin—Bd. Comrs. Johnson Co., L. A. Young, aud., Court House, May 9, 2 story, brick, stone hospital, from Greene & Gust, 52 W. Washington St., Chicago, Ill., **$170,863**. CD 4/17—ENR 4/19.

PUBLIC BLDGS. (Low Bidders. Cont'd.)

†N. C., **Raleigh**—Bureau of Mines, Interior Bldg., E St. between 18 and 19 Sts. N.W., Wash 25, D. C., May 3, laboratory bldg., from Atlantic Bldg. Co., P. O. Box 246, Charlotte, Zone 1, **$151,600.** CD 4/24—ENR 4/26.

†Tex., **Hooks**—Pub. Housing Auth., NHA, 411 Electric Bldg., Seventh and Lamar Sts., Fort Worth, Zone 2, May 8, 100 family dwelling units, from Atlas Constr. Co., Texarkana, **$289,678.** CD 4/24—ENR 4/26.

★†Wash., **American Lake** — Veterans Admin., Vermont Ave. between H and I Sts. N.W., Wash. 25, D. C., May 8, addnl. bldgs., utilities, from MacDonald Bldg. Co., 1517 S. Tacoma Way, Tacoma, **$2,059,827.** CD 3/22—ENR 3/29.

CONTRACTS AWARDED

†Calif., **Campo**—U. S. Eng., 751 S. Figueroa St., Los Angeles, Zone 55, conversion bldg. at Mitchell Convalescent Hospital, to Del E. Webb, 406 S. Spring St., Los Angeles, **$362,102.**

†Calif., **Oakland**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., addnl. galley messing and power facilities for barracks, Naval Supply Depot, Spec. 18052, NOY 11769, to Oakland Constr. Co., 210 Crocker Bldg., 620 Market St., San Francisco, **$150,950.** Bids 4/26. CD 5/4, under LB.

★†Calif., **Torrance**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., four 202x602 ft., storehouses, administration bldgs., utilities on 90 acre site east of Crenshaw Blvd., Spec. 15679, NOY 11364, to P. J. Walker Co., 3900 Whiteside Ave., Los Angeles, **$1,609,513.** Bids 4/17. CD 4/23, under LB.

†Fla., **Daytona Beach**—U. S. Eng., Post Office Bldg., Savannah, Ga., central steam plant and outside steam distr. and altering boiler room in main hospital at Welch Convalescent Hospital, to Henry G. DuPree Co., 1102 Alvarez St., Jacksonville, **$73,913.** CD 4/25.

†O., **Ravenna**—U. E. Eng., 925 New Federal Bldg., Pittsburgh, Pa., storage pallets and barricades at Ravenna Ordnance Plant, to Gallagher & O'Horo, 1818 Wilson Ave., Youngstown, **$58,000.** Awarded 5/11.

★Pa., **Phila.**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., storehouse for radio, radar and ship outfitting material, Navy Yard, NOY 11778, to Hughes-Foulkrod Co., 1505 Race St., **$534,400.** CD 4/24.

★S. C., **Charleston**—Yards & Dooks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., addnl. magazines, Naval Ammunition Depot, Spec. 16190, NOY 11923, to V. P. Loftis, Builders Bldg., Charlotte, N. C., **$1,008,897.** Bids 3/30, awarded 5/10. CD 4/10, under LB.

†Wash., **Spokane**—Sacred Heart Hospital, 101 S St., Spokane, 2 story, rein.-con. nurses home addn., to Bouten Constr. Co., N. 215 Division St., **$157,000.** FWA, C. A. Pehrson, Hutton Bldg., archt.

N. S., **Halifax**—Halifax Bd. School Comrs., 11 Sackville St., high school auditorium and gymnasium, Robie St. school grounds, to Fundy Const. Co. Ltd., Islerville and Russel Sts., **$463,225.** Bids 4/23. CD 4/16—ENR 4/19.

Que., **Sorel**—O. Cartier, secy. School Comn. of Sorel, City Hall, school and residence, for School Comn., to Gaspard Archambault, Ltd., 736 Atwater Ave., Montreal, **$222,700.** Bids 4/23. CD 4/5—ENR 4/12.

COMMERCIAL BUILDINGS

PROPOSED WORK

Calif., Dunsmuir—V. Andreatta, Mount Shasta and E. Barnum, 625 Shasta View Way, reconstructing fire-wrecked 4 story hotel, $150,000.

Nev., Reno—Brown Bros., 320 S. Virginia St., 100 residences. Over $400,000.

★**O., Maumee**—Anthony Wayne Development Co., A. Zachman, treas., plans by Geo. H. Burrows & Assoc., engrs. and archts., 3113 S. Moreland Blvd., Shaker Heights, Cleveland, Zone 20, 2 story bsmnt., 100 x 375 ft., concrete, brick, stone shopping center. $500,000 incl. land and equip.

Pa., Mount Lebanon (br. Pittsburgh)—Mt. Lebanon Presbyterian Church, Dr. J. M. Simpson, in charge of fin. cam., Jefferson Dr., religious education center, classrooms, utility rooms, attached to church proper. $150,000. Partially financed.

Wash., Vancouver—St. Joseph's Hospital, Vancouver, plans by J. W. Maloney, Larson Bldg., Yakima, nurses home, and hospital addn., $245,000. Seeking FWA funds.

Man., Winnipeg—P. Miller, Manitoba Telephone Sys., 166 Portage Ave. E., soon lets contract, telephone exchange. Plans deposit $5. C. W. U. Chivers, 406 Nanton Bldg., archt.

N. S., Sydney Mines—Harbour View Hospital Bd., Sydney Mines, hospital. $150,000.

Ont., Sturgeon Falls—Congregation of the Sisters of Wisdom, Sturgeon Falls, plans by P. J. O'Gorman, Sudbury, hospital, chapel, etc. $300,000. CD 3/14.

Ont., Toronto—Owner, c/o C. B. Dolpin, archt., 43 Victoria St., commercial bldg., Adelaide and York Sts. $250,000.

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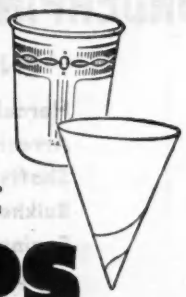

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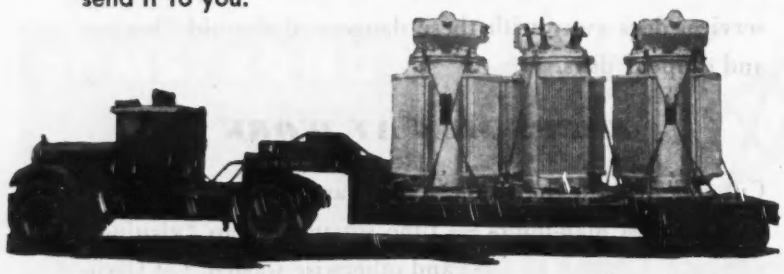

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COMMERCIAL BUILDINGS (Cont'd.)

BIDS ASKED

Bids Asked About May 22

Me., Houlton—Ricker Classical Institute & Junior College, High St., superstructure for 2 story, bsmnt., 61x145 ft., concrete, brick arts and science bldg. Total est. approx. $150,000. A. J. Harriman, 88 Shepley St., Auburn, archt. CD 9/28—ENR 10/5.

Bids Asked May 24

S. C., Winnsboro—U. S. Rubber Co., Winnsboro Mills, Winnsboro, office bldg. Lafaye, Lafaye & Fair, 1226 Sumter St., Columbia, archts.

Bids Asked May 26

Ontario—C. B. Dolphin, archt., 43 Victoria St., Toronto, Red Cross Hospitals at Wiarton, Huntsville and Bancroft, for Canadian Red Cross Society, 621 Jarvis St., Toronto. About $150,000.

CONTRACTS AWARDED

N. J., Vineland—N. J. Bell Telephone Co., 540 Broad St., Newark, Central office bldg., to Mahony-Troast Contr. Co., 657 Main Ave., Passaic. Est. **$150,000.** Bids 4/16, awarded 5/4. CD 4/6—ENR 4/12.

Pa., Harrisburg—W. F. Keiser Co., 4621 Jonestown Rd., housing development, day labor. **$150,000.** H. A. Levan, 203 Market St., engr.

R. I., Pawtucket—A. J. Lamarre, 25 Capewell Ave., Pawtucket, 35 frame housing units, Newport Ave. Owner builds. **$160,000.** A. Gauvin, 27 Weybosset St., Providence, archt. CD 5/9/44—ENR 5/11/44.

★ **R. I., Warwick**—American Home Builders, 74 Brookside Dr., Cranston, 100 frame residential development, to J. Mansolillo, 74 Brookside Dr., Cranston. Est. **$550,000.**

Wis., Milwaukee—St. Anthony's Hospital, 1022 N. 10 St., Zone 3, 5 story, bsmnt., 53 x 167 ft. and wing, hospital addn., to H. Schmitt & Sons, Inc., 930 E. Burleigh St., Zone 12. E. Brielmaier & Sons, 735 N. Water St., Zone 3, archts.

INDUSTRIAL BUILDINGS

PROPOSED WORK

Conn., Sandy Hook—SHOP—Watkins Machine Shop, Glen Rd., rebuilding shop, destroyed by fire, $45,000.

Conn., Stamford—FACTORY, etc.—Electronic Rubber Co., 69 Sunnyside Ave., plans by D. Mansell, 24 Park Row, 1 story, bsmnt., 50x150 ft., brick, concrete factory and boiler plant, Fairfield Ave.

Kan., Bushton—COMPRESSOR STATION—Northern Natural Gas Co., Aquila Court, Omaha, Neb., natural gas compressor station. Over $100,000.

Ky., Midway—PLANT—Park & Tilford Distillers of Kentucky, Inc., 35 and Tyler Sts., Louisville, feed recovery plant, to J. D. Jennings, 17 and Breckenridge Sts., Louisville. Est. **$350,000.** Bids 2/15, awarded 4/25.

La., Baton Rouge—PLANT BLDG.—Bodman & Murrell, archts., Reymond Bldg., cafeteria bldg. for Ethyl plant, North Baton Rouge, for Standard Oil Co., Ethyl Plant, North Baton Rouge. CD 5/2—ENR 5/10, under North Baton Rouge.

La., Baton Rouge—PLANT—Ethyl Corp., 1000 N. 21 St., imprv. ethyl chloride mfg. plant. Over $60,000.

La., Baton Rouge—BOOSTER STATIONS—Interstate Oil Pipeline Co., N. B. Bldg., Baton Rouge, 3 booster or pump. stations for crude oil pipeline between point in state of Mississippi and Baton Rouge. Over $75,000 each.

Mass., Springfield—FACTORY—Standard Electric Time Co., 89 Logan St., soon lets contract 1 story, brick, steel, concrete factory addn. Over $40,000. McClintock & Craig, Inc., 458 Bridge St., archts.

Mich., Flint—PLANT—Buick Motors Div. of General Motors Corp., Flint, revised plans by Albert Kahn Associated Architects & Engineers, Inc., engrs. and archts., 345 New Center Bldg., Detroit, brick, steel, rein.-con. Plant 12. $200,000. CD 4/23—ENR 4/26.

Minn., St. Paul—POWER PLANT IMPROVEMENTS—C. T. Miller Hospital, Dr. P. D. Ward, supt., 126 W. College Ave., bids soon furnishing, installing boiler, stoker and piping for power plant. $40,000. C. H. Johnston, 715 Empire Bank Bldg., engr.

Mont., Billings—FREIGHT TERMINAL—Freightways Terminal Co., 2155 Northlake Ave., Seattle 3, Wash., plans by J. G. Link & Co., Electric Bldg., 100x200 ft., rein.-con., freight terminal replacing structure, destroyed by fire, $100,000. CD 3/22—ENR 3/29.

R. I., Providence—FACTORY—Kestenman Brothers Mfg. Co., 150 Chestnut St., soon lets contract, 1 story, 80x280 ft., brick, steel, concrete factory, Knaley St. $85,000. Barker & Turoff, 1022 Grosvenor Bldg., archts. CD 5/11 ENR 5/17.

Neb., Ralston—WAREHOUSE—Nebraska Seed Co., Ralston, seed warehouse. $80,000.

N. H., Laconia—FACTORY—Belkrop Mills Corp., 37 Mill St., plans by N. P. Randlett, 614 Main St., 2 story, brick, mill. addn., Mill St. $40,000.

N. H., Manchester—OIL TERMINAL—Socony Vacuum Oil Co., Inc., 170 Baker St., 1 story, 70x75 ft. truck garage, 4 steel oil tanks and earth dikes, Baker St. $50,000.

INDUSTRIAL BUILDINGS (Proposed Work, Cont'd.)

N. J., Bridgeton—WAREHOUSE—Seabrook Farms, Upper Deerfield Twp., bids soon cold storage warehouse. $400,000 incl. equip. United Engineers & Contractors, Inc., 1401 Arch St., Phila., Pa., engrs. CD 11/20—ENR 11/23

N. Y., North Hoosick—FACTORY—White Flomatic Corp., North Hoosick, bids soon from revised plans, rebuilding factory. $135,000. Bids 4/9 rejected. Keis & Holroyd, 257 Bway., Troy, engrs. CD 4/4—ENR 4/12.

O., Cincinnati—PLANT—Diskel Corp., 4701 Paddock Rd., chemical mfg. plant. $220,000.

Ore., Garibaldi—SAWMILL, etc.—Oceanside Lumber Co., Inc., Garibaldi, development recently acquired Peterman Plywood Co., incl. sawmill, planing mill, machine shop and outbuildings, $500,000.

Ore., Portland — FACTORY — Westcraft Paint Co., c/o Preservation Paint Co., 5410 Airport Way, Seattle, Wash., plans by Wolff & Phillips, Pearson 4th Ave. Bldg., 2 story, 40x90 ft., rein.-con. factory and 40x50 ft., rein.-con. warehouse, 16 and Quinby Sts., $50,000.

Ore., Worden—GRAIN ELEVATOR—Tulana Farms, Malin, rejected bids May 3, rein.-con. storage bins and head house, installing grain and seed cleaners with 14 reinforced steel circular storage tanks, $282,000. Construction postponed. E. F. Carter, Metropolitan Bldg., Vancouver, B. C., engr. CD 4/24—ENR 4/26.

Pa., Lester—TEST CELLS—Westinghouse Electric & Mfg. Co., 527 Blvd. of Allies, Pittsburgh, soon lets contract, test cells. $185,000. L. C. Mechling, c/o owner, engr. CD 3/28—ENR 4/5.

Pa., Phila.—TRUCK LOADING STATION—Albert's Delivery Service, 1505 N. 5 St., truck loading station, 5 and Oxford Sts. $200,000.

Pa., Phila.—GARAGE, etc.—Modern Heat & Fuel Co., 4415 Chestnut St., garage and office bldg., 5 storage tanks. Approx. $100,000.

Pa., Phila.—PLANT—William Moland's Sons, 152-158 Laurel St., plans by Smith, Brubaker & Egan, 30 N. LaSalle St., Chicago, Ill., packing plant alterations, addns. $100,000.

Tex., Carthage—PLANT—Union Producing Co., c/o United Gas Bldg., Houston, gas plant in Panola field, near here. $150,000.

Tex., Houston—PLANT—Nyotex Chemical Co., M. Esperson Bldg., 1 story, chemical plant addn., Greens Bayou, near here. $100,000. Howe & Wise, 610 Stewart Bldg., engrs.

Tex., Houston—WAREHOUSE—A. P. Simons, Ross and Magnolia Sts., plans by L. E. O'Banion, c/o owner, 1 story, bsmnt. warehouse. $50,000.

N. C., Charlotte—BAKERY—Queen Pie Co., 498 Central Ave., 70x100 ft., bow-string truss type bakery. M. E. Boyer, Jr., 202 Latta Arcade, archt.

BIDS ASKED

Bids Asked May 15

Ont., London—CAR TRUCK REPAIR—Canadian National Rys., B. Wheelwright, ch. engr. (Oper.), 360-55 McGill St., Montreal, Que., car truck repair bldg. $45,000. Plans deposit $25.

Bids Asked

Tex., Pittsburg—PLANT—Gilbert C. Wilson Laboratories, Pittsburg, reconstructing dehydrated potato curing plant. $75,000. CD 3/12—ENR 3/15.

Wis., Beloit — GENERATING PLANT ADDITION—Wisconsin Power & Light Co., 22 W. Washington St., Madison, 1 story, 96x118 ft., brick, steel, rein.-con. generating plant addn. Sargent & Lundy, 140 S. Dearborn St., Chicago, Ill., engrs. CD 12/19—ENR 12/21.

CONTRACTS AWARDED

Calif., Los Angeles—PLANT—Reliable Nut Co., 1823 S. Hope St., food processing bldg., reinforced masonry and concrete to Ted R. Cooper Co., 1121 S. Hill St., approx. $40,000.

Conn., New London — FACTORY — New England Collapsible Tube Co., 170 Broad St., 1 story, bsmnt., 55x70 ft., brick, steel factory, owner builds. $65,000. L. F. Caproni, 1221 Chapel St., New Haven, archt. P. D. Harriman, 37 Whitney Ave., New Haven, engr. CD 5/9.

Conn., Norwalk—PLANT—Norwalk Tire & Rubber Co., Winnepauk, Norwalk, 2 story, 72x198 ft., brick, steel, boiler plant and administration bldg. addn., to E & F Constr. Co., 84 Wells St., Bridgeport. Est. $45,000. CD 5/1—ENR 5/3.

Conn., Stamford—PLANT—Atlas Powder Co., 269 Ludlow St., 2 story, 40x100 ft., brick, steel plant, to Samworth-Hughes Co., 17 Van Houten St., Paterson, N. J. $42,000. W. Hanson, Delaware Trust Bldg., Wilmington, Del., engr. CD 4/16—ENR 4/19.

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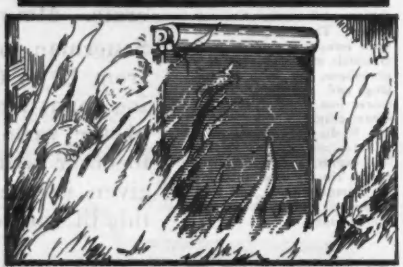

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INDUSTRIAL BLDGS. (Contracts Awarded, Cont'd.)

Ill., Macomb—FACTORY—Hemp & Co., Macomb, 1 and 2 story, brick, concrete, steel factory, to John Feimley & Co., Bloomington, **$200,000.** Shaw, Naess & Murphy, 80 E. Jackson Blvd., Chicago, archts. CD 2/20—ENR 3/1.

Ind., Fort Wayne—PLANT—General Electric Co., 1635 Bway., 2nd story plant addn., Winter St., to Indiana Engineering & Const. Co., Inc., 203 Old-First Bank. Est. $50,000.

Mich., Ypsilanti—CORE ROOM—Central Specialty Co., Ypsilanti, 1 story, steel, brick, rein.-con. core room for foundry plant, to W. E. Wood Co., 4649 Humbolt Ave., Detroit. Est. **$75,000.**

Mo., St. Louis—MACHINE SHOP—Gruendler Crusher Co., 2915 N. Market St., Zone 6, 1 story, 70x103 ft., brick machine shop addn., concrete fdn., 2915 N. Market St. to E. G. Lay, 5471 N. Kingshighway Blvd., $40,000 with equip. C. A. Koerner, Syndicate Trust Bldg., 10 and Olive Sts., engr.

Mo., St. Louis—PLANT—Hercules Die Co., lessee, 4722 Newcomb Pl., altering, impry. 1 story, 135x185 ft., corrugated steel plant bldg., incl. installing heat treating furnaces, etc., 3405 Morganford Rd., to H. B. Deal & Co., 1218 Olive St., Zone 3. Est. $40,000 plus with equip.

Mo., St. Louis—FACTORY—Missouri Pipe Fittings Co., 2318 Randolph St., Zone 3, altering various bldgs. in factory group recently acquired, constructing rein-con., shipping dock and ramps, etc., separate contracts. **$40,000** with equip. O. K. Krieg, 3624 S. Bway., Zone 18, archt.

N. D., West Fargo—PLANT—Armour & Co., U. S. Yards, Chicago, Ill., J. E. Pyle, branch mgr., curing plant, incl. equip., to Meinecke & Johnson Co., 7 14 St. N., Fargo. **$240,000.**

O., Clyde — FACTORY — Clyde Porcelain Steel Corp., T. E. Stokes, vice pres., Clyde, general contract 1 story, 150x216 ft., structural steel factory, to Steinle-Wolfe Const. Co., 1515 Groghan St., Fremont. Est. **$109,780.** C. H. Shively, 400¼ Groghan St., archt. CD 8/10—ENR 8/17.

O., Columbus—FACTORY ALTERATIONS—Surface Combustion Co., E. C. Piper, mgr., 400 Dublin Ave., factory alterations, incl. shipping dock, inclosing space between 2 existing bldgs., to L. M. Leonard Co., 42 E. Gay St. **$123,650.** D. Carmichael, 5 E. Long St., archt.

Ore., Pendleton — CANNERY — Pendleton Cannery & Frozen Foods Co., Pendleton, 1 story, 100x170 ft., pea cannery, with 1 story, 108x170 ft. tile warehouse, to Wiley Constr. Co., Walla Walla, Wash. Est. **$97,000.** C. S. Miller, Pendleton, archt. CD 3/29—ENR 4/5.

Ore., Portland—PLANT—General Mills, Inc., Sperry Div., 180 New Montgomery St., San Francisco, Calif., remodeling, altering bldg., providing warehouse space, 139 S.E. Washington St., to Ertz & Burns, Pittock Blk. Est. **$48,993.** CD 4/30—ENR 5/3.

Pa., Phila.—PLANT—Pennsylvania Range Boiler Co., 24 St. and Washington Ave., rebuilding mfg. plant, to Jack S. Steele Co., 1316 Arch St. **$200,000-$300,000.** Awarded 5/2. CD 5/2—ENR 5/10.

Tex., Houston—WAREHOUSE—Feld Reynolds Warehouse, 501 Middle St., warehouse unit, to Maesco Co., 119 McCall St., **$41,398.** CD 5/9.

Tex., Houston—PLANT—Southern Warehouse Corp., 4410 Clinton Dr., rice drying plant, structural steel, rein.-con., to J. W. Gaddy, 1210 Texas St., approx. **$80,000.** Finger & Rustay, 711 National Standard Bldg., engrs.

Tex., Houston—ROUNDHOUSE—Texas & New Orleans R. R. Co., H. J. McKenzie, ch. engr., Southern Pacific Bldg., Zone 1, masonry, brick, tile roundhouse addn., to Crawford Const. Co., McAllen. **$40,000.** CD 5/9.

Wis., Milwaukee — MACHINE SHOP — Badger Tool & Engrg. Co., 3364 W. Hopkins St., Zone 9, 1 and 2 story, part bsmt., 27x100 ft., brick, steel, machine shop-office addn., concrete fdn., to Gebhard-Berghammer Co., 5420 W. State St., Zone 8, Brimeyer, Grellinger & Rose, 730 N. Jackson St., Zone 2, archts.

Wis., Waukesha—GARAGE—Owner, c/o J. Menge, Jr., archt., 108 W. Wells St., Milwaukee, Zone 2, 1 story, bsmnt., 80x115 ft., steel truss, garage, concrete block fdn., to Daum & Zingen Const. Co., 2230 N. 81 St., Wauwatosa, Zone 13. CD 5/2—ENR 5/10.

Wis., Waukesha—ASSEMBLING PLANT—Waukesha Motor Co., Waukesha, 3 story, 70x365 ft., steel, rein.-con., brick assembling plant, concrete fdn., to Hunzinger Const. Co., Sta. K, Milwaukee, Zone 13. CD 4/25—ENR 5/3.

Ont., Lindsay — PLANT — Page & Steel, archts., 20 St. Clair Ave. W., Toronto, dry goods factory for A. Bradshaw & Sons, Ltd., 507 College St., Toronto, to Eastwood Const. Co. Ltd., Dominion Bank Bldg., Peterboro, about **$175,000.** CD 5/2.

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PROPOSED WORK

Ala., Ragland — NATURAL GAS DISTRIBUTION SYSTEM—Town natural gas distr. sys. $40,000. J. W. Goodwin Engrg. Co., Martin Bldg., Birmingham, engr.

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BIDS ASKED

Bids Asked May 22

N. Y., St. George—LIGHTING SYSTEM—Comr. Water Supply, Gas & Electricity, Municipal Bldg., New York, installing public lighting sys. on safety aisle at St. George Ferry Terminal. Plans deposit $2.

N. S., Halifax — HARBOR IMPROVEMENTS—D. W. Riddell, Nat. Harbors Bd., Ottawa, Ont., harbor imprvs., shed reconstruction, for Dominion Govt., Ottawa, Ont. Over $40,000. Plans deposit $25.

Bids Asked May 23

†**Conn., New Haven**—HARBOR SURVEY—U. S. Eng., 819 Industrial Trust Bldg., Providence 2, R. I., probing survey New Haven Harbor, No. 45/13.

Bids Asked June 5

†**Oregon**—TRANSMISSION LINE CLEARING—Bonneville Power Admin., 1300 N.E. Union Ave., Portland, clearing 42 mi. right-of-way for Albany-Toledo transmission line, Linn, Benton and Lincoln Counties. Plans deposit $5.

Bids Asked

★ †**Calif., Hunters Point**—FILL—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., addnl. fill, south area, Naval Dry Docks, NOY 12248. $500,000.

†**Me., Bangor**—LANDING SYSTEM—Civil Aeronautics Admin., 385 Madison Ave., New York, N. Y., construct bldg., and revision instrument landing, Dow Field.

†**Me., Presque Isle**—AIRPORT GRADING, etc.—Civil Aeronautics Admin., 385 Madison Ave., New York, N. Y., grading, paving, drainage and repair work, Municipal Airport.

LOW BIDDERS

†**Ariz., Chandler**—HANGARS, etc.—U. S. Eng., 751 S. Figueroa St., Los Angeles 55, Calif., May 3, converting hangars, etc., at Williams Field, from Tanner Constr. Co., Box 1832, Phoenix, **$178,585.**

†**Ariz., Luke Field (br. Phoenix)**—SEAL COATING, etc.—U. S. Eng., 751 S. Figueroa St., Los Angeles 55, Calif., May 7, seal coating and patching landing mat, No. 239, from Arizona Sand & Rock Co., Box 1522, Phoenix, **$101,415.**

†**Ariz., Tucson**—SCORING TARGETS—U. S. Eng., 751 S. Figueroa St., Los Angeles 55, Calif., May 4, 5 sonic bomb scoring targets at Davis-Monthan Field, Inv. 297, from J. S. Sundt, 440 S. Park Ave., **$45,955.**

Calif., Camp Roberts—TRAINING POOL—U. S. Eng., 74 New Montgomery St., San Francisco, May 11, standard training pool, Job No. 2085, from H. C. Geyer, 787 Munras Ave., Monterey, **$93,547.**

Calif., Rice—SCORING TARGETS—U. S. Eng., 751 S. Figueroa St., Los Angeles, Zone 55, May 4, 9 sonic bomb scoring targets, near here, No. 299, from Drury Electric Co., P. O. Box 1270, San Bernardino, **$92,700.**

†**Calif., Victorville**—GASOLINE STORAGE U. S. Eng., 751 S. Figueroa St., Los Angeles, Zone 55, May 11, gasoline storage facilities, Victorville Army Airfield, No. 279, from Wonderly Constr. Co., 2494 Lime Ave., Long Beach, **$41,951.**

†**Colo., Pueblo**—FIRE WALLS, etc.—U. S. Eng., 909 17 St., Denver, May 10, fire walls and concrete floors in 7 warehouses at Pueblo Ordnance Depot, from Colorado Pre-Mix Concrete Co., 400 S. Lipan St., Denver, Schedules 1 and 2, **$196,655**; Schedules A and 2, **$198,755**; Schedules 1B and 2, **$183,972.**

†**Mass., South Boston** — WATERFRONT REPAIRS, etc.—U. S. Eng., 31 St. James Ave., Boston, May 10, waterfront repairs and protection, No. 19-023-45-Neg-121, from C. J. Maney Co., Inc., 24 Dane St., Somerville, **$456,920.**

†**Mass., Watertown** — AUTOMATIC SPRINKLER PROTECTION SYSTEM—U. S. Eng., 31 St. James Ave., Boston, Zone 16, May 8, automatic sprinkler protection sys., at Watertown Arsenal, Spec. 19-023-45-Neg-127, from J. Ventura, 37 Haverhill St., Lawrence, **$41,400.**

†**Neb., Sidney**—STORAGE PADS—U. S. Eng., 909 17 St., Denver, Colo., 50 covered storage pads for ammunition storage at Sioux Ordnance Depot, from Northwestern Engrg. Co., Rapid City, S. D., **$324,510.**

†**Tex., Palestine**—AIRPORT—U. S. Eng., P. O. Box 155, Fort Sam Houston, May 5, turfing, repairing erosion damage at municipal airport, from Burnham Const. Co., Georgetown, **$59,407.**

CONTRACTS AWARDED

†**California**—STORAGE AREA—U. S. Eng., 74 New Montgomery St., San Francisco, Zone 19, storage area, Spec. 2056 A, Marin Co., to Piombo Bros. & Co., 1517 Turk St., San Francisco, **$51,000.**

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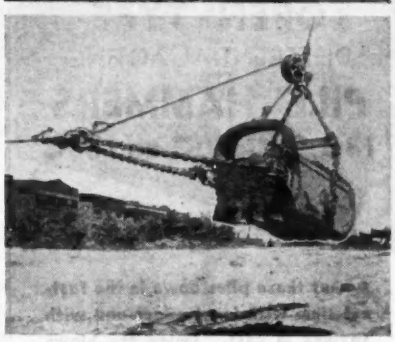

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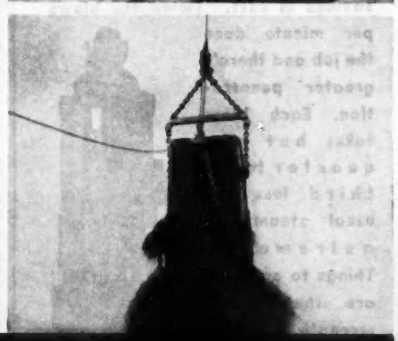

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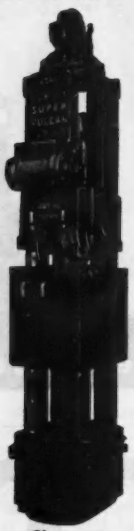

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CONTRACTS AWARDED

†Calif., Hamilton Field—GASOLINE PIPELINE—U. S. Eng., 74 New Montgomery St., San Francisco, gasoline pipeline, Spec. 2012, to Underground Constr. Co., 75th Ave. and San Leandro Blvd., Oakland, **$117,687.** CD 5/8—ENR 5/10, under LB.

★**†Calif., Mills Field**—AIRFIELD PAVING, etc.—U. S. Eng., 74 New Montgomery St., San Francisco, paving and lighting at Mills Field, Spec. 1563, and drainage, Spec. 1563-2, both at Mills Field, to Macco Constr. Co. and Morrison-Knudsen, Inc., 111 Sutter St., San Francisco, **$582,675** and **$56,690** respectively. CD 5/1—ENR 5/3 under LB.

†Calif., Oakland—MOVING MOTOR POOL—U. S. Eng., 74 New Montgomery St., San Francisco, moving motor pool at Oakland Army Base, Spec. 2124, to Stolte, Inc., 8451 San Leandro St., **$231,700.**

Conn., Manchester—SWIMMING POOL—Town, H. M. Reed, first selectman, Town Hall, swimming pool, N. Main St., rear Robertson Playground, to Alexander Jarvis Co., 6 Dover Rd. Est. **$55,000.** Bids 5/3. CD 4/30.

†Ga., Saint Simons Island—TAXIWAYS, etc.—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash 25, D. C., surfacing runway ends and taxiways with 2 in. hot plant mix, asphalt, concrete and repair lighting sys., Naval Air Station, NOY 11242, to R. B. Tyler Co., 1446 Levering St., Louisville, Ky., **$77,826.** CD 4/24.

†Ia., Ottumwa—SEAL COATING, etc.—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., seal coating and patching mats and drill field, Naval Air Station, NOY 11262, to J. C. Blunk Constr. Co., Ottumwa, **$29,854.**

Mass., Oak Bluffs—BATHHOUSE—Town Bd. Selectmen, Town Hall, bathhouse, pavilion, locker rooms and facilities, to E. Turgeon, 614 Turks Head Bldg., Providence, R. I., **$44,397.** Bids 5/4. G. S. Darling, 184 Bank St., Fall River, archt.

†N. C., Greensboro—AIRFIELD GRADING, etc.—U. S. Eng., Post Office Bldg., Savannah, Ga., grading, drainage and paving for apron and connecting taxiways at Greensboro-High Point Airfield, to Suber & Co., Whitmire, S. C., **$45,274.** Bids 4/30. CD 4/25.

†N. J., Bayonne—RAILROAD TRACKS, etc.—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., railroad tracks, grading, platform and drainage, Naval Supply Depot, NOY 11925, to Chas. F. Vachris, Inc., 827 Remsen Ave., Brooklyn, N. Y., **$377,886.**

★**N. Y., Idlewild**—AIRPORT GRADING, etc.—Comrs. Dpt. Marine & Aviation, Pier A, North River, New York, Zone 4, grading, draining, paving at airport, Contr. 2434, to Gull & De Felice, 518 Porter Ave., Brooklyn, Zone 22, **$2,845,000.** Bids 4/4. CD 4/6—ENR 4/12, under LB.

★**N. Y., Idlewild**—ELECTRIC CONDUITS—Dpt. Marine & Aviation, Pier A, North River, New York, Zone 4, underground electric conduits at airport, to Plymouth Electric Co., 21 E. 40 St., New York, Zone 17, **$508,000.** Bids 4/12. CD 4/17—ENR 4/19, under LB.

Ohio—RURAL ELECTRIC LINES—Washington Rural Electric Co-op., Marietta, furnishing, erecting 83 mi. rural electric lines, Washington Co., to D & W Constr. Co., 297 S. High St., Columbus, **$89,000.** R. Woolpert Realty Bldg., Dayton, engr.

★**†Ore., Hermiston** — OPEN STORAGE PADS, etc.—U. S. Eng., 628 Pittock Blk., S.W. 10 Ave. and Washington St., Portland, Zone 5, open storage pads with barricades, approaches at Umatilla Ordnance Depot, to J. H. Collins & Co., and R. L. Bair & Co., P. C. Box 678, Walla Walla, Wash., **$566,480.** CD 5/7—ENR 5/10, under LB.

Ore., Portland—RECONSTRUCTING DRYDOCK—Port of Portland Comn., Spalding Bldg., reconstructing Drydock 1, to Glipin Constr. Co., 4850 N.W. Front St., **$92,965.** Former low bid withdrawn. CD 4/10—ENR 4/12, under LB.

Washington — RAILROAD WORK — Spokane, Portland & Seattle Ry. Co., A. J. Witchel, ch. engr., 1101 N.W. Hoyt St., Portland 7, Ore., restoring embankment and correction of drainage on 45 mi. track, south of Spokane and on 27 mi. line, on Columbia River west from Lyle, Spokane and Klickitat Counties, to Morrison-Knudsen Co. Inc., 319 Bway., Boise, Idaho. Est. **$135,000.**

†Pa., Butler—SWIMMING POOL—U. S. Eng., Standard Oil Bldg., Baltimore 2, Md., swimming pool at DeShon General Hospital, to Henretty Const. Co., 806 Century Bldg., Pittsburgh. Est. **$50,000.**

†Tenn., Memphis—SEAL COATING, etc.—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D.C., seal coating, landing mat, runway and outlying field, Naval Air Station, NOY 11432, to Lehman-Roberts Co., P. O. Box 691, **$116,187.**

★**†C. Z., Coco Solo**—AIR STATION TEST CELLS—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., engine test cells, Naval Air Station, NOY 10938, to Tucker McClure, 659 S. Olive St., Los Angeles 14, Calif., **$540,288.** CD 4/3—ENR 4/5.

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